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FEDERAL - STATE - PRIVATE

# SNOW SURVEY and WATER SUPPLY FORECASTS for MONTANA & NORTHERN WYOMING

UNITED STATES DEPARTMENT of AGRICULTURE...SOIL CONSERVATION SERVICE.

and

MONTANA AGRICULTURAL EXPERIMENT STATION

Data included in this report were obtained by the agencies named above in cooperation with the Bureau of Reclamation, U.S. Forest Service, U.S. Geological Survey, National Park Service, State Engineers of Montana and Wyoming and other Federal, State, and private organizations.

MAR. 13.961

MAY 1, 1961

### UNITED STATES DEPARTMENT OF AGRICULTURE - SOIL CONSERVATION SERVICE

To Recipients of Cooperative Snow Survey and Water Supply Forecast Reports:

The climate of the cultivated and populated areas of the West is characterized by relatively dry summer months. Such precipitation as occurs falls mostly in the winter and early spring months when it is of little immediate benefit to growing crops. Fortunately, most of this precipitation falls as mountain snow which stays on the ground for months, melting later to sustain streamflow during the period of greatest demand during late spring and summer. Thus, nature provides in mountain snow an imposing water storage facility.

The amount of water stored in mountain snow varies from place to place as well as from year to year and accordingly, 30 does the runoff of the streams. The best seasonal management of variable western water supplies results from fore-knowledge of the runoff.

A snow survey consists of a series of about ten samples taken with specially designed snow sampling equipment along a permanently marked line, about 1000 feet in length, called a snow course. The use of snow sampling equipment provides snow depth and water equivalent values for each sampling point. The average of these values is reported as the snow survey measurement for a snow course.

Snow surveys are made monthly or semi-monthly beginning in January or February and continue through the snow season until April, May or June. Currently more than 1400 western snow courses are measured each year. These measurements furnish the key data for water supply forecasts.

By relating snow survey measurements taken over a period of years to spring-summer runoff during the same period, relationships have been developed which make it possible to forecast seasonal runoff several months in advance of occurrence. In order to make a forecast, once a forecast relationship has been developed, the maximum snow water content at previously selected key snow courses is usually entered in the forecast relationship. More accurate forecasts are often obtained when other factors such as soil moisture, base flow and spring precipitation are considered and included in the forecast relationships.

Listed below are the Federal-State-Private Cooperative Snow Survey and Water Supply Forecast reports available for the West which contain detailed information on snow survey measurements, streamflow forecasts, reservoir storage, soil moisture and other guide data to water management and conservation decisions.

#### PUBLISHED BY SOIL CONSERVATION SERVICE

REPORTS	ISSUED	LOCATION	COOPERATING WITH
RIVER BASINS			
COLORADO ANO STATE OF UTAH	_ MONTHLY (JANMAY)	SALT LAKE CITY, UTAH	. UTAH STATE ENGINEER AND OTHER AGENCIES
COLUMBIA	MONTHLY (JANMAY)	BOISE, IOAHO	. IOAHO STATE RECLAMATION ENGINEER
UPPER MISSOURI AND STATE	MONTHLY (FEBMAY)	BOZEMAN MONTANA	MONT. AGR. EXP. STATION
WEST-WIDE	OCT. 1, APR. 1, MAY 1_	PORTLANO, OREGON	ALL COOPERATORS
STATES			
ALASKA	MONTHLY (MAR MAY)	PALMER, ALASKA	ALASKA S.C.D.
AR I ZON A	SEMI-MONTHLY (JAN.15 - APR.1)		SALT R. VALLEY WATER USERS ASSOC. ARIZ. AGR. EXP. STATION
COLORADO ANO NEW MEXICO	MONTHLY (FEBMAY)	FORT COLLINS, COLORAGO	COLO. AGR. EXP. STATION COLO. STATE ENGINEER N. MEX. STATE ENGINEER
IOAHO ———	MONTHLY (FEBMAY)	BOISE, IOAHO	. IOAHO STATE RECLAMATION ENGINEER
NEVAOA	MONTHLY (FEBAPR.)	RENO, NEVADA	NEVAGA DEPT. OF CONSERVATION AND NATURAL RESOURCES DIVISION OF WATER RESOURCES
ORE GON	_MONTHLY (JANMAY)		ORE. AGR. EXP. STATION OREGON STATE ENGINEER
WASHINGTON	MONTHLY (FEBMAY)	. SPOKANE, WASHINGTON	WN. STATE DEPT. OF CONSERVATION
WYOMING	MONTHLY (FEB. JUNE)	CASPER. WYOMING	WYOMING STATE ENGINEER
Copies of these various report	ts may be secured from:	Head, Water Supply Forect Soil Conservation Service 209 S. W. Fifth Ave., Po	e.
	PUBLISHED B	OTHER AGENCIES	
REPORTS	ISSUED		AGENCY
BRITISH COLUMBIA	_ MONTHLY (FEBJUNE)		RIGHTS BR., DEPT. OF LANOS ANO T BLOG., VICTORIA, B.C., CANAOA
CALIFORNIA	MONTHLY (FEBMAY)	CALIF. DEPT. OF WA	TER RESOURCES, SACRAMENTO, CALIF.

### FEDERAL-STATE-PRIVATE COOPERATIVE

### SNOW SURVEYS AND WATER SUPPLY FORECASTS

For

#### MONTANA AND NORTHERN WYOMING

(Upper Missouri and Upper Columbia River Basins)

Report Prepared Ву

A. R. Codd Hydraulic Engineer Soil Conservation Service Soil Conservation Service

P. E. Farnes and Hydraulic Engineer

U. S. Department of Agriculture Soil Conservation Service Montana Agricultural Experiment Station Bozeman, Montana

Issued By

H. D. Hurd State Conservationist of Montana

O. W. Monson Irrigation Engineer Montana Agricultural Experiment Station

R. E. Huffman Director Montana Agricultural Experiment Station



### TABLE OF CONTENTS

	age
STATE OF MONTANA WATER SUPPLY OUTLOOK	1
SNOW COURSE & RIVER BASIN MAP MONTANA & WYOMING	3
COMPARISON OF SNOW COVER	4
AVAILABLE SOIL MOISTURE	5
WATER SUPPLY OUTLOOK FOR TRIBUTARY WATERSHEDS:	
Kootenai Watershed Flathead Watershed I Lower Clark Fork Watershed II Upper Clark Fork Watershed II Upper Clark Fork Watershed Bitterroot Watershed Marias, Teton & Sun Watershed IV Missouri Main Stem Watershed IV Beaverhead & Jefferson Watershed VII Madison & Gallatin Watershed II Judith & Musselshell Watershed IV Upper Yellowstone Watershed IV	II V VI II II XX
STATUS OF RESERVOIR STORAGE IN WYOMING, NORTH & SOUTH DAKOTA	50
NORTHERN WYOMING SNOW SURVEY DATA	52
NORTHERN WYOMING STREAMFLOW FORECASTS	53
LIST OF COOPERATORS Inside Back Cove	er



## MONTANA WATER SUPPLY OUTLOOK as of May 1, 1961

### IRRIGATION WATER SUPPLY

Critically short water supplies are evident on the Beaverhead, Ruby, Clarks Fork and Rock Creek areas of the Yellowstone and Musselshell Rivers, all in the Missouri basin. A short water supply is also expected in the Upper Clark Fork River of the Columbia basin.

The Madison and Gallatin Rivers are expected to produce a Fair water supply. May first forecasts reamin at 78 percent average, as flows will be slightly less than last year. The winter snow-pack throughout the State is confined to high elevations, as the accumulation of snow came relatively late in the season. These factors, together with May temperatures, will affect the timing of peak flows.

The Yellowstone River at Corwin Springs above Livingston is forecast to flow 73 percent average during the irrigation season. This "fair" supply diminishes downstream with only 45 percent average flow expected to pass Sidney. Due to early and extremely heavy irrigation demands, the present river stage is very low.

The Beaverhead Basin supply is very critical, with only 48 percent average flows forecast for the Red Rock River near Monida. The Lima Reservoir is very low with only 23,600 acre feet of water stored on the first of May. The normal storage on May first is 58,100 acre feet. The Big Hole River is slightly better and forecast at 66 percent average flow. These figures are slightly less than last year's flows.



The Main Stem of the Missouri River is expected to produce a 66 percent average flow, or 1,327,000 acre feet from May through September. This flow is slightly less than last season when 1,350,000 acre feet entered Canyon Ferry Reservoir.

The percentage of flow decreases downstream until only 59 percent average flow is expected this season into Fort Peck Reservoir. The volume flow forecast is 2,461,000 acre feet from May through September; last year's flow was 2,627,000 acre feet.

The Columbia River Basin in Montana has a much brighter prospect for an adequate water supply. A normal season's supply is expected from May through September. There is one critical area on the Upper Clark Fork River above Milltown, where the May-September flow is forecast at 46 percent average. The Blackfoot and Bitterroot basins have a "fair" amount of snow and are expected to produce a seasonal flow of 77 and 75 percent average respectively. These streams add sufficient water to the Clark Fork to bring the forecast at St. Regis up to 71 percent average. With the normal flow of the Flathead joining the Clark Fork at Plains, the forecast at this point is 88 percent average or 9,576,000 acre feet for the May-September period. At the western Montana border the forecast for this same period is 10,723,000 acre feet or 88 percent average, which is slightly higher than the 1960 seasonal flow of 10,598,000 acre feet.

### SNOW COVER

May first snow cover remains unchanged since April first. Although there are spots where snow on high elevation courses has increased, many low elevation courses are bare, or nearly bare. The bulk of the winter snow-pack is in the higher elevations.

### PRECIPITATION

Valley precipitation during April was about half the normal amount in the southeastern portion, 90 percent normal in the southwestern, and almost twice normal in the western part of the State. Precipitation was 5 to 20 percent above normal over the remainder of the State.

### SOIL MOISTURE

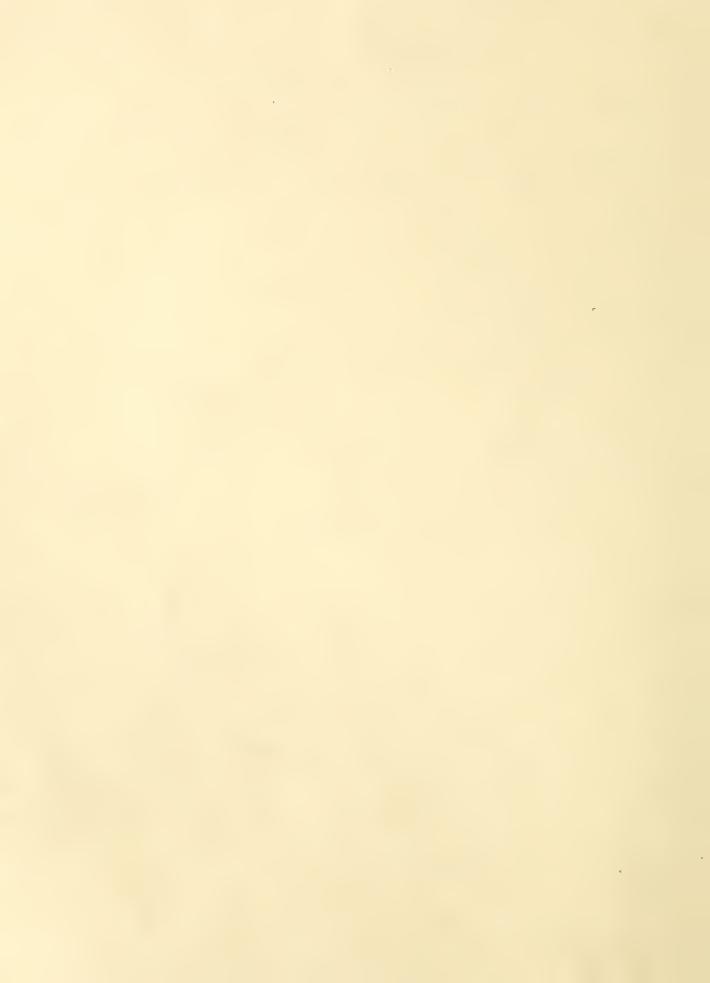
Soil moisture is far below average. Recent storms dampened only the top layer of soils. Heavy moisture is necessary to re-charge dry subsoils before building a reserve. Much of the snow water will be retained to bring mountain soils to the saturation point before discharge is evident in streams.

### IRRIGATION RESERVOIR STORAGE

Irrigation reservoir storage in the Missouri is about 11 percent below the May first average volume. Likewise, small irrigation reservoirs on the Columbia basin are only 10 percent below the average stored volume.









## INDEX TO MONTANA & NORTHERN WYOMING SNOW COURSES

Orainags Basin and Course Name	Montar Number		Sec.		Range Long.			Keasured By	Drainage Basin and Course Name	Montana Number	Mev.	Locat Sec. Lat.	lon Tw.	Range Long.	Record Began	Measuring Dates	Measured By	Drainage Basin and Course Name	Montana Number	Elev.	Locati Sec. Lat.	on Twp.	Range Long.	Record Began	Measuring Oates	Measured By
JEFFERSON HIVER	110010	_	SOURI RI								MISSOURI	RIVER O	RAINAŒ	(cont.)						HISSOURI	RIVER O	RAINAGE	(cont.)			
(ROCK-BEAVE	RHEAD)								(UPPER YELLO	ISTONE)						1	,	(TONGUE RIVER		0000	•••	~m:	0011	3056	0.21.6	
Lakeview Ridge Lakeview Canyon Limekiln White Fine Ridg	12E2	7400 69 <b>30</b> 69 <b>5</b> 0 8850	26 5	143 143 153 143	9W 2W 2W	1948 1948 1948 1948	3,4,5 3,4,5 3,4 3,4	10 10 1	Camp Senia Canyon Cooke City Crevice Mt. Independence	901 10E3 1007 10D5 10D6	7890 7750 7400 8400 8000	25 22 22 22 22	9S 9S 9S 7S	18E 110°-3G 14E 9E 12E	1937 1935 1940	1,2,3,4,5 1,2,3,4,5 3,4 3,4	6 6 2 1	Horse Trail Div. Lake Geneva North Tongue Sibley Lake Sucker Creek	7E19 7E16 7E15 7E11 7E12	9200 9000 8800 8000 9000	29 7 17 10 19	55N 52N 55N 55N 55N	90W 86W 89W 88W 87W	1956 1956 1956 1956 1956	2,3,4,5 2,3,4,5 2,3,4,5 2,3,4,5 2,3,4,5	1 1 1 1 1
Bloody Dick	1,3010			83 83	16W 16W	1948 1948	3, h	1	Lake Camp Lupine Creek Lodgepole West Eosebud	10E4 10E1 9E1 9D?	7850 7300 8200 7500	ابلبا*-34 ابلبا*-54 32 10		110°-24 110°-37 106W		1,2,3,4,5 1,2,3,4,5 2,3,4,5 1,2,3,4,5	6 6 1,4	Steamboat Point Wood Rock G.S. (POWDER RIVER)	7510 7513	7500 8500	32 3	56n 5Un	87W 86W	1956 1956	2,3,4,5 2,3,4,5	1
Gold Stone Lumhi Paes Terroll Greek Trail Greek Selway Junction	1309 13E1 13012 13E2 13011	7090	9 14 15	103 93 103 83	15W 15W 15W 15W	1948 1948 1948 1948	3,4	1 1 1 1	(SHIELES RIVE Porcupine LOWER YELLOWSTON	1003	6500	10	Įέξ	10E	1938	3,4	1	Crazy Woman Muddy Creek O.S. Munkers Pass North Powder #2	6E2 6E1 7E8 7E36	8200 7800 9700 8300	6 2 11 20	47N 48K 46N 47N	84n 84n 85w 85w	1956 1956 1950 1956	2,3,4,5 2,3,4,5 2,3,4,5 2,3,4,5	1 1 1
(BIO HOLE)  Big Holo Pass Big Holo Pass		7240 6900	211	33 38	18W 18W	1948 1948	3,4	1	(WIND RIVER) Big Warm	9F12	8800	36	421	109W	1955	2,3,4,5	1	Onion Gulch Soldier Park Sour Dough	7E27 7E5 7E6	8100 8700 8500	31 36 17	48n 51n 49n	85W 85W 8LW	1956 1950 1936	2,3,4,5 2,3,4,5 2,3,4,5	1 1 1
Zant Boundary Gibbons Pass Jahnke Creek Miner Forks	1305 1302 1308 1306 1307	6700 7100 7340 7300 6720	22 4 25 21, 10	33 23 73 63 63	17W 19W 16W 17W 16W	1948 1934 1948 1948 1945	1,2,3,4,5 3,4 3,4	1 1,3 1 1	Brooks Lake #3 Burroughs Creek Dinwoodie Ory Creek	10P8 9F4 9F10 9F9 9P6	9200 8800 10000 9500 8750	23 15 21 34 27	7511 1721 13511 14271 14771	110W 107W 105W 6W 108W	1939 1948 1948 1948 1940	2,3,4,5 2,3,4,5 2,3,4,5 2,3,4,5 2,3,4,5	1 1 1	KOOTENAI RIVER	15811	5500	MBIA RIV	ZER BASIN	30W	1956	1. 5 52	2
Miner Lake	)						3,4,5	1	Dulloir East Pork Geyser Creek Little Warm	9F1.3 9F7 9P8	9200 8500 9500	23 12 24	77.R 77.N 77.R	104W 108W 108W	1956 1948 1948	2,3,4,5 2,3,4,5 2,3,4,5	1 1 1	Baree Cresk Baree Mountain Red Mountain Weasel Oivids	1581 1581 1541 1447	6000 6000 5450	1 4 8	25N 36N 37N	31W 29W 26W	1937 1937 1937 1955	4,5,5\$ 4,5,5\$ 3,4,5,5\$ 4,5,5\$	2 1,2 1,2
Anderson Mdw. Elk Horn Wiso River	13014 13015 13013		18 15 15	3S I <sub>1</sub> 3 23	12W 12W 12W	1948 1935 1948	3,4 3,4,5 3,4	3	Sheridan R.S. #1 Sheridan R.S. #2 T-Gress Ranch Togwotee Pase	9F5 9F14 9P3 10P9	7500 7500 8000 9600	3 1 29	142N 143N 143N	109W 109W 107W 110W	1939 1955 1940 1936	2,3,4,5 2,3,4,5 2,3,4,5 2,3,4,5	1 1 11	FLATHEAD RIVER Basin Creek Big Creek	1381LA 1383	5000 6750	11 6%7	19N 22N	12W 18W	1951 1941	2,3,4,5	2 5 1,2
( <u>RUBY RIVER</u> ) Flashlight	1203	6950	22	83	7W	1945	3,4,5	1	(POPO AOIE RI	802	9500	23	311	101W	1939	2,3,4,5	1	Brush Creek Cattle Queen Desert Mountain Hell Roaring Oiv.	14A4 13A1 13A2M 14A3	5000 4700 5600 5770	13 7 24 35	30N 35N 31N 32N	26W 17W 19W 22W	1937 1939 1937 1942	3,4,5 3,4,5 1,2,3,4,5 3,4,5	1,2 1,2
MADISON RIVER Hebgen	11E5	6550	22	113	3E	1934	1,2,3,4,5	3	Bruce's Camp Nobb'e Park Moequito Park R.S Sawmill Olade	805 903 904 801	6500 10000 9500 8500	24 22 23 3	321 23 23 311	101W 3W 3W 101W	1955 1948 1940 1939	2,3,4 2,3,4,5 2,3,4,5 2,3,4,5	1 1 1	Holbrook Kiebenehn Logan Creek Marias Pass	13B13A 14A6 14A5 13A5M	4530 3886 4300 5250	18 14 34 34	21N 37N 30N 30N	13W 22W 2UW 1UW	1951 1954 1937 1934	1,2,3,4,5 4,5 3,4,5 1,2,3,4,5	6 2 3
West Yellowatons Norris Basin	11E7 10E2	6700 7500	34 14101414 1	135	5E 110°-42	1934 1936	1,2,3,4,5 3,4	3 6	South Pass St. Lawrence Trout Creek (OWL CREEK) W	803 9F11 902 yoming	9000 9000 8400	13 26 5	301 1.0 2.5	101W LW 2W	1939 1940 1948	2,3,4,5 2,3,4,5 2,3,4,5	1 1 1	Mineral Creek Quintonkon Spotted Bear Mt. Strawberry Lake Trinkus Lake	13A16 13A13 13B2M 13A10 13B1	4000 3800 7000 6500 6500	29 11 23 11 9	35N 26N 25N 28N 25N	17W 17W 15W 19W 17W	1957 1951 1948 1948 1948	3,4,5 2,3,4,5 3,4,5 3,4,5 3,4,5	6 1,2 1,2 2 2
GALLATIN RIVER									Beavere Mill Owl Creek	9F2 8F1	8900 8700	6 <b>3</b> 6	43N 43N	102W 101W	1948 1948	2,3,4,5 2,3,4,5	1	Trout Lake Twin Creeks Upper Holland Lk.	13A12M 13B11 13B5	3600 3580 7000	21 14 28	28N 26N 20N	17W 16W 16W	1948 1951 1948	3,4,5 2,3,4,5 3,4,5	1,2 1,2 2
Devil'e Slide Hood Mendow New World	1004 1001	8100 6600 6700	11i 22 24	58 48 33	6E 6E 6E	1935 1935 1939	2,3,4,5 2,3,4,5 1,2,3,4,5	2,1 2,1 7	(GREYBULL RIV	9E2	8800	25-	478	103W	1948	2,3,4,5	1	CLARK FORK Baree Creek	15811	5500 6000	6	25N 25N	30W 31W	1956 1937	4,5,5 4,5,5	
21-M11n MISSOURI RIVER MA	11E6 UN STEM	7150	1	115	5E	193h	1,2,3,4,5	3	Timber Creek #2 Wood River #1 Wood River #2	9E3 9F1 9F15	8800 8000 8000	25 28 28	468 468	103W 103W 103W	1955 1939 1956	2,3,4,5 2,3,4,5 2,3,4,5	1 1 1	Baree Mountain Black Pine Coyote Hill El Dorado Mine	15B1 13013 13310 1309	7100 4200 7800	25 12 23	8N 18N 8N	15W 16W 12W	1960 1952 1949	3,1,5 1,2,3,1,5	1 2 1
Cheesman Reservoi		6200	2	8N	5W	1936	1,2,3,4,5	3	(SHOSHONE RIVE		ng							Fred Burr Pass Freezeout Summit	13C11 15B10	0008 0086	12 21	6N 15N	134 27W	1957 1937	3,4,5 4,5	1 2
Crystal Leke Oreashoppor Kings Hill Picnic Orounds	901 1002 1001 1206	6100 7000 7950 6500	19 19 35 10	12N 9N 13N 5N	18E 8E 7E 6W	1941 1938 1934 1941	3,4 3,4 3,4,5 2,3,4	1,2 2 3 4	East Entrance Sylvan Pass (NOWOOO CREEK)	10E6 10E5 Wyoming	7000 7100	17 12	52N 52N	109W 110W	1948 1936	1,2,3,4,5 1,2,3,4,5	6	Gold Creek Lk. Hoodoo Creek Intergaard Lubrecht Forest #6	13010 1501 1304 5 1308	7200 6200 6450 6450	14 9 6 11	77'N 2N 77'N	12W 27W 13W 15W	1949 1937 1936 1951	4 4,5 2,3,4 1,2,3,4,5	1 2 4 12
Pipestone Pass Stemple Pese Ton Mile Creek L Ton Mile Creek M	1201 1201 1202 1203	7200 6900 6250 6800	10 16 13 13	1N 13N 8N 8N	7W 7W 6W 6W	1938 1934 1935 1934	2,3,4,5 3,4,5 1,2,3,4,5 1,2,3,4,5	3 3	Cold Springs Camp Medicine Lodge Lks Munkers Pass	7E25	8700 9500 9700	1 7 11	50N 51N 48N	88W 87W 85W	1956 1956 1950	2,3,4,5 2,3,4,5 2,3,4,5	1 1	North Fork Jocko Pipestone Pass Red Lion Slide Rock Mt.	13B7 1201 13012 1302	6330 7200 7000 7100	3 10 27 35	17N 1N 6N 10N	17W 7W 13W 16W	1941 1938 1958 1937	3,4,5 2,3,4,5 3,4,5	5 1 1
Ten Mile Croek U (TETON RIVER)	1204	8000	19	8N	5W	1935	1,2,3,4,5	3	North Powder Onion Gulch	7E36 7E27	8300 8100	20 31	47N 48N	85W 85W	1956 1956	2,3,4,5 2,3,4,5	1	Southern Cross Stemple Pass	1305 1201	6500 6900	8 16	5N 13N	13W 7W	1936 1934	2,3,4 3,4,5	<u>1</u> 3
Freight Croek	12AL	6000	13	26N	10W	1948	3,4	1	Tensleep Lake Tensleep R.S. Tyrell R.S.	7E26 7E7 7E35	9075 8300 8300	33 30 30	50N 49N 49N	86W 86W 86W	1956 1935 1956	2,3,4,5 2,3,4,5 2,3,4,5	1 1 1	Storm Lake Stuart Mill Stuart Mountain	1307 1306 1301	7780 6500 7400	19 19 6	777 22 770	13W 13W 18W	1939 1936 1936	4,3,4 1,3,4 ا	1 4 1,2
Waldron Cresk West Fork	12B2 12B1	5600 6000	16	25N 25N	9W	1948 1948	3,4 3,4	1	(SHELL CREEK)		0,00	,,,	4/"	00#	2,,,,	-101410	-	TV Mountain BITTERPOOT RIVER Ambrose	1481	6800	33	15N 9N	19W	1956	1,2,3,4,5	1,2
( <u>SUN HIVER</u> ) Benchmark	1288	5500	9	20N	low	1948	3. h	1	Bald Mountain Beaver-Tongue Div. Bone-Spring Div.	7E21 7E20 7E18	9600 9200	33 12	56N 55N 55N	91W 91W 89W	1956 1956 1956	2,3,4,5 2,3,4,5	1 1 1	East Fork R.S. Gibbons Pass	13D1 13D2	5400 7100	16 4	2N 2S	17W 19W	1937 1934	3,4,5 4 1,2,3,4,5	1 3,1
Cabin Cresk 5-Bull	12B6 12B9	5400 5600	33 36	23N 20N	10W 10W	1949 1948	3,4 3,4 3,4 3,4	1,2 1,2	Granite Creek Camp Oranite Pass		9200 7800 8950	32 15 19	53N 54N	89W 88W	1956 1956	2,3,4,5 2,3,4,5 2,3,4,5	1	Lolo Pass Lost Horse Nez Perce Camp	1405 1407 1402	52 30 5940 5580	16 5 19&2	38N 4N 0 1S	15E 23W 23W	1956 1960	3,4,5, 3,4,5	5½ 2 1
Gates Park Goat Mountain Wrong Ridge	12B5 12B7 12B3	5300 7000 6800	31 20 17	24N 22N 25N	10W	1949 1934 1949	3,4 3,4 3,4	1,2 3 1,2	Horse-Trail Div. Ranger Creek Shell Creek	7E19 7E4	9200 8800	29 32	55N 53N	90W 88W	1956 1935	2,3,4,5 2,3,4,5	1	Mez Perce Pass Powell R.S.	1401 1406	6575 4230	32 33	28N 37N	17E 14E	1937 1937 1956	3,4,5 1,2,3,4,48, 3,4,5,	5,5½ 1 5½ 2
Wrong Creok (MARIAS RIVER)	1284	5700		25N		1949	3,4	1,2	(PORCUPINE CREE	7E23 EK) Wyomin	9600 ng	12	52N	88W	1956	2,3,4,5	1	Skalkaho Summit Twin Lakes	1303 1408	7259 6510	30 32	6n 5n	17W 23W	1937 1960	4 3,4,5	1
Marias Pass	13A5M	5250	34	30N	ЩW	1934	1 1 2   C	-	Five Spgs. Falls	7E31	7500	19	56N	92W	1956	2,3,4,5	ı	ST. MARY RIVER Iceberg Lake #3	13A3	SASKA 5600	180-50	RIVER	BASTN 113°-43'	1922	_	
(MILK RIVER)		, , ,		Ju.,		17.54	1,2,3,4,5	3	Medicine Wheel  (TONGUE RIVER)	7E30 Wyoming	9000	24	56N	92W	1956	2,3,4,5	1	Josephine Upper Josephine Lower #	13A15 9 13A14	5000 4900	480-50	) †	113°-42 1	1956 1955	5 5	3,9
Rocky Boy (MUSSELSHELL RI	9Al VER)	5200	15	28N	16E	1941	3,4	7	Beaver Tongue Div. Big Goose #1 Big Goose #2	7E20 7E2 7E32	9200 7700 7700	12 4 4	55N 53N 53N	91W 86W 86W	1956 1935 1955	2,3,4,5 2,3,4,5	1 1 1	Mount Allen #7 Piegan #6 Ptarmigan #8	13A7 13A6 13A8	5700 5500 5800	48°-46 48°-50	<u>1</u>	113°-411 113°-411 113°-441	1 1922	5 5	3,9 3,9 3,9
Orasshopper	1002	7000	19	9N	8E 3	1938	3,4	2	Bone-Spring Div. Burgess R.S. #1 Burgess R.S. #2	7E18 7E1 7E33	9200 7900 7900	32 36 36	55N 56N 56N	89W 89W 89W	1956 1950 1955	2,3,4,5 2,3,4,5 2,3,4,5	1 1	a. Numerals 1,2,	3,4 and 5	refer to	Januar	y 1, Feb	ruary 1,	March 1,	April 1 and	May 1.
									Dome Lake #1 Dome Lake #2	7E3 7E34	8800 8800	11 11	53N 53N	87W 87W	1950 1950	2,3,4,5 2,3,4,5 2,3,4,5	1	b. Numerals refe	r to Agend	by that s	ecures	the snow	survey	as follow	18:	
200 SCS TIRCOTA RETAIN 1839									QLoom Creek Granite Pass	7E14 7E17	9300 8950	32 19	55N 5UN	87W 88W	1956 1956	2,3,4,5 2,3,4,5	1	1. Soil Conserva 2. U. S. Forest 3. U. S. Geologi 4. Montana Power 5. U. S. Indian	Service cal Survey Company Service	у м.		Moisture	8. 9. 10.	City of Dominion U.S. Fi U.S. Bu	Water & Powersh and Wildli reau of Recla	er Bureau ife Service amation
																		6. National Park	Service	A	- Aeria	l Marker	12.	Montana	State Foresti	ry School

### COMPARISON OF SNOW COVER WITH THAT OF PREVIOUS YEARS

Summary of Snow-Survey Data by Tributary Watersheds May 1, 1961

TRIBUTARY WATERSHED	No. of Courses Averaged	No. Years Used	1961 Snow Water Equivalen Expressed as Percent of 1960 1943-57 Average	nt
	COLUMBIA RIVE	R BASIN IN	MONTANA	
Kootenai above Libby	12	5-15	133 115	
Flathead	22	7-15	127 115	
Lower Clark Fork	9	6-14	122 109	
Upper Clark Fork	7	12-15	95 105	
Bitterroot	4	13-15	105 95	
	MISSOURI RIVER	R BASIN IN	<u>MONTANA</u>	
Marias, Teton & Sun	5	15	150 125	
Missouri Main Stem	6	11-15	92 100	
Beaverhead-Jefferson	10	7-15	107 94	
Madison-Gallatin	6	4-15	133 109	
Judith-Musselshell	1	11	90 90	
Upper Yellowstone	10	4-15	123 87	



### AVAILABLE SOIL MOISTURE

as of May 1, 1961

Daringgo			Soil P	rofile	,	Soil	Moietu	re Con	tont	Y
Drainage Basin and	Station	Elev.		nches	Date			bout 5		r
Station	No.		Depth	Cap.			1960		Avg.	s
	annual and annual and annual and annual and annual				)			A STATE OF THE PARTY OF T		
GALLATIN		. [			; :			1	1	
College Site	11D2M	4856	54	14.5	4/28	11.3	13.1	11.9	12.0	4
MADISON		:				}				
Red Bluff	11D4M	4800	40	2.9	4/30	5.1	-	-	-	-
SHIELDS										
Battle Ridge	10D11M	6020	48	13.3	4/28	14.4	_	_	_	-
Shields River	10C4M	5850	48	15.9		16.4	_	-	-	-
FLATHEAD					!					1
Desert Mountain	13A2M	6370	54	6.8	4/24	8.2	8.8	8.7	8.2	4
Marias Pass	13A5M	5250	54	8.4	4/28	6.8	6.8	6.6	6.8	7
Spotted Bear R.S.	13B15M	3700	28	5.9	4/27	5.1	4.9	5.0	5.0	4
Trout Lake	13A12M	3600	54	11.8	4/25	12.5	12.4	12.3	12.5	4

## AVAILABLE SOIL MOISTURE as of October 1, 1960

		a control of the cont				1960	1959	1958	Avg.	
GALLATIN College Site	11D2M	4856	54	14.5	9/30	5.8	8.6	6.8	5.8	4
MADISON Red Bluff	11D4M	4800	40	2.9		New S	tation			
SHIELDS Battle Ridge Shields River	10D11M 10C4M	6020 5850	48 48	13.3 15.9	10/3 10/3	10.6	-	-	-	_
FLATHEAD Desert Mountain Marias Pass Spotted Bear R.S. Trout Lake	13A2M 13A5M 13B15M 13A12M	6370 5250 3700 3600	54 54 28 54	6.8 8.4 5.9 11.8	9/23 9/26 9/23 9/23	4.5 3.2 0.6 6.9	7.2 5.6 4.3 9.8	5.9 4.5 3.7 10.5	6.1 4.7 3.1 7.9	4644



## WATER SUPPLY OUTLOOK

## KOOTENAI RIVER BASIN MONTANA

AS OF: MAY 1, 1961

### U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

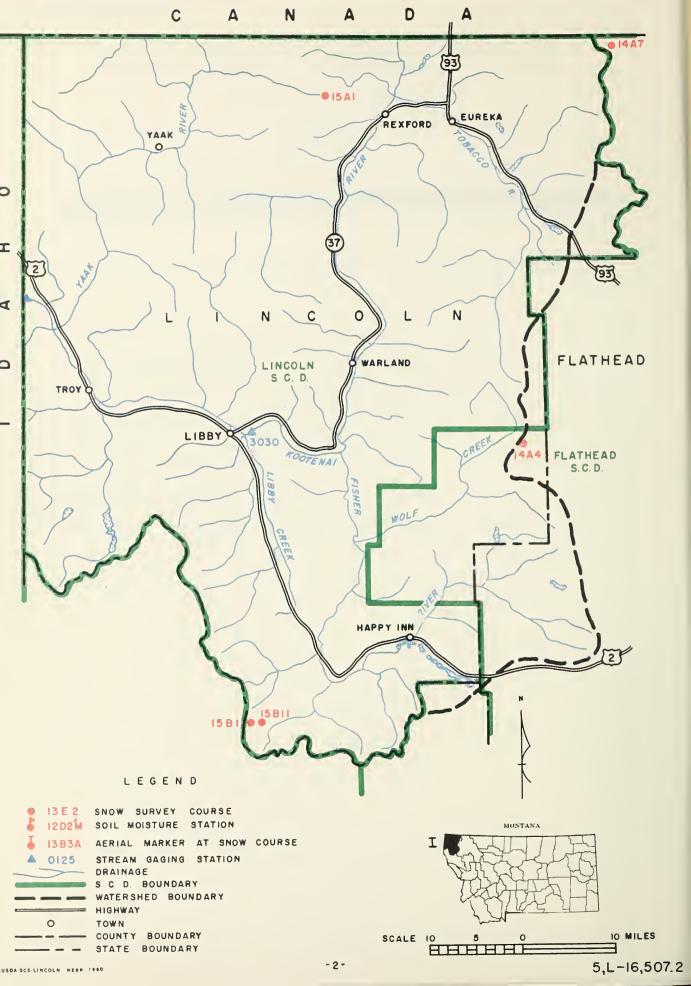
The Water Supply Outlook for the Kootenai basin in Montana is Good.

Snow surveys made in Canada and Montana near the first of May indicate the present snow-pack is 33 percent greater than last year and 15 percent above the 1943-57 average.

Streamflow in the Kootenai River is forecast to be above average and more than last year for the coming five months period, May through September. Streamflow in the Yaak, Tobacco and Fisher Rivers should be slightly greater than last year during the May through September period.

Report Prepared by \_

A. R. CODD AND P. E. FARNES
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
BOX 855 BOZEMAN, MONTANA



## WATER SUPPLY FORECASTS

AS OF MAY 1, 1961 - WATERSHED I

(1000 Acre Feet)

					(1000	Acre Feet)
	FORECAST POINT	FORECAST	FORECAST	5	MEAS	URED
NO.	MAME	PERIOD	THIS YEAR	NORMAL	LAST YEAR	NORMAL
3030 3050	KOOTENAI RIVER Libby (at) Leonia (at)	May-Sept May-July May-Sept May-July	7685 6532 8650 7480	108 108 108 108	6536 5480 7211 6159	7053 6024 7994 6903
(+) Pr	ovisional data furnished by	U. S. Geolog	ical Surv	ey.		

## RESERVOIR STORAGE DATA

AS OF

(1000 Acre Feet)

		USABLE		MEASURED	(1000 ACF8 Feet
NO.	RESERVOIR	CAPACITY	THIS YEAR	LAST YEAR	NORMAL

NOTE: ALL NORMALS BASED ON 1943-1957 (15 YEAR PERIOD)

USDA SCS LINCOLN. NEBR 1980

## SNOW SURVEY DATA AS OF MAY 1, 1961 - WATERSHED I

				T 111505	TION			
	SNOW COURSE		DATE	NT INFORMA	WATER	PAST R WATER C	DHTENT	YEARS
N O •	NAME	ELEVATION	OF SURVEY	DEPTH (Inches)	(Inches)	LAST YEAR		OF RECORD
5811 1581 14A4 Can 10 Can 12A Can 33 Can 20B Can 32 Can 10A 15A1 Can 8A Can 20A Can 41 14A7	Baree Creek Baree Mountain Brush Creek Fernie Field Gray Creek Kicking Horse Kimberley Marble Canyon New Fernie Red Mountain Sinclair Pass Sullivan Mine Upper Elk River Weasel Divide	5500 6000 5000 3500 4200 5100 5400 3800 5000 4100 6000 4500 5100 4400 5450	5/2 5/2 4/21 4/28 4/30 4/29 5/1 4/28 4/19 5/1 4/28 4/20	110 108 34 9 2 65 34 1 49 31 60 8 43 16 106	53.0 51.1 12.6 2.3 0.5 23.7 12.8 0.5 13.0 10.2 23.4 2.6 16,5 4.1 41.0	43.2 42.8 7.3 0.0 0.0 18.9 11.4 0.0 20.2 0.5 11.1 0 34.3	- 46.8 12.3 2.8 0.9 20.1 11.8 - 13.6 6.4 19.7 2.1 11.5 - 34.7	- 15 8 12 5 10 11 7 15 8 12 - 13

TE: ALL AVERAGES BASED ON 1943-1957 (15 YEAR PERIOD). "YEARS OF RECORD" INDICATED NUMBER OF YEARS USED IN 1943-1957 PERIOD.

## WATER SUPPLY OUTLOOK

### FLATHEAD RIVER BASIN MONTANA

MAY 1, 1961

### U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

The Water Supply Outlook for the Flathead River drainage is Good.

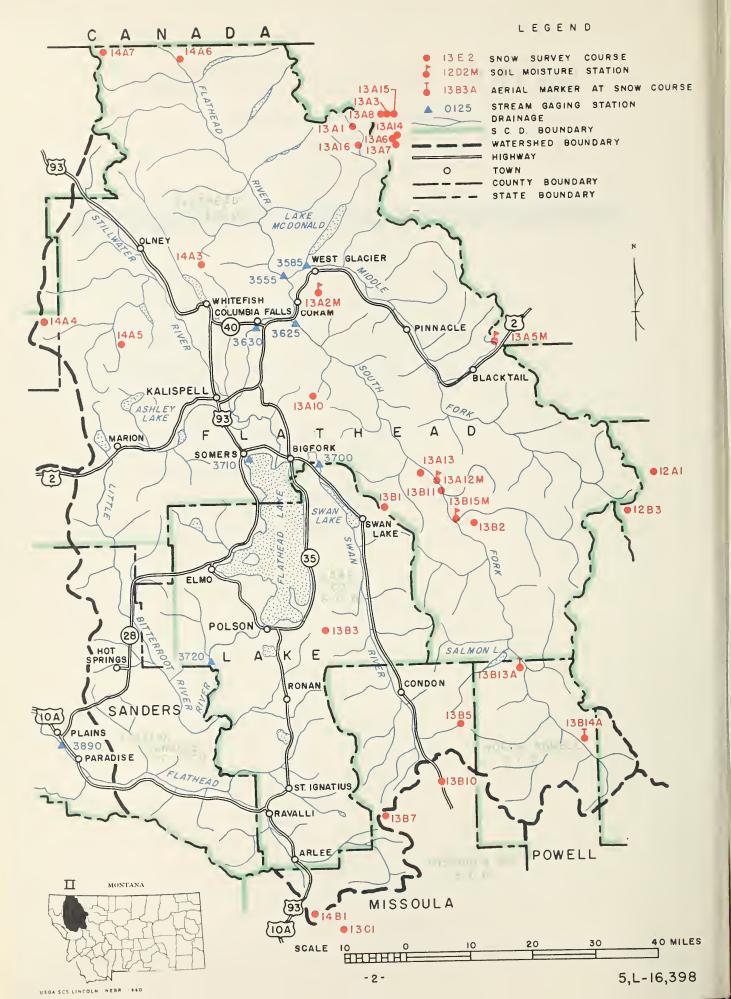
Snow surveys made near the first of May indicate this year's snow-pack is 27 percent greater than last year and 15 percent greater than the 1943-57 average. However, this snow-pack is confined to the higher elevations.

Streamflow forecasts for the May through September period are near normal. The South Fork Flathead is expected to produce 95 percent normal flow for the May through September period.

Irrigation reservoir storage is below normal and less than last year.

Report Prepared by \_

A. R. CODD AND P. E. FARNES
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
BOX 855 BOZEMAN, MONTANA



## WATER SUPPLY FORECASTS

AS OF

	AS OF MA	NY 1, 1961 -	WATERSH	ED II	(100	O Acre Feet)
	FORECAST POINT	FORECAST	FORECAST	\$	MEAS	SURED
NO.	MAME	PERIOD	THIS YEAR	NORMAL	LAST YEAR	+ NORMAL
	NORTH FORK FLATHEAD RIVER		!			
3555	Columbia Falls (near)	May-Sept	1920	110	1617	1749
		May-July	1728	110	1448	1576
		May-June	1425	110	1102	1298
2505	MIDDLE FORK FLATHEAD RIVER	), G .	7/22	00	7,00	1600
3585	West Glacier (near)	May-Sept May-July	1633 1502	97 97	1488 1360	1687 1553
		May-June	1250	97	1105	1286
	SOUTH FORK FLATHEAD RIVER					
3625	Columbia Falls (nr)(17)	May-Sept	1918	95	1805	2015
		May-July	1804	95	1697	1897 1617
	FLATHEAD RIVER	May-June	1525	94	1450	1017
3630	Columbia Falls (at)(17)	May-Sept	5626	100	4955	5608
		May-July	5174	100	4532	5155
200	7.7 ( ) (2.0)	May-June	4318	100	3762	4302
3720	Polson (near) (18)	May-Sept May-July	6610 6090	100 100	6077 5526	6605 6081
		May-June	5061	100	4541	5039
	SWAN RIVER	1100	, , , ,		4242	,,,,
3700	Big Fork (near)	May-Sept	584	107	588	554
		May-July	514	107	498	479
		May-June	399	107	377	374
(17) 01	served flow plus change in	storage in H	unany Hor	ee Reger	woir	
	served flow plus change in					
F	athead Lake.					
( +) P	ovisional data furnished by	U. S. Geolo	gical Sur	vey.		

## RESERVOIR STORAGE DATA

	AS OF	APRIL 30 196	61		(1000 Acre Feet)
,		USABLE		MEASURED	
NO.	RESERVOIR	CAPACITY	THIS YEAR	LAST YEAR	NORMAL
3620 3710 3757 3800 3805	Hungry Horse Flathead Camas Mission Valley Lower Jocko Lake	3428.0 1791.0 45.2 100.3 7.6	2213.0 1276.0 31.6 37.1 0.7	2507.0 1118.0 39.9 59.0 3.1	1985.6 936.0 30.6 46.8 1.0

NOTE: ALL NORMALS BASED ON 1943-1957 (15 YEAR PERIOD)

## SNOW SURVEY DATA

AS OF MAY 1, 1961 - WATERSHED II

			CURREI	NT INFORMA	TION	PAST R	ECORD	
	SNOW COURSE		DATE	SNOW	WATER	WATER C	ONTENT	YEARS
NO.	NAME	ELEVATION	OF SURVEY	DEPTH (Inches)	(Inches)	LAST YEAR		OF RECORD
			1		<u> </u>	T CAN		
13B14A	Basin Creek	5000	4/28	0	0.0	0.0	2.1	7
14B3	Bassoo Peak	5150	4/28	32	9.5	_		
13B3	Big Creek	6750	5/2	126	56.4	53.2	48.1	8
1383 14A4	Brush Creek	5000	4/21	34	12.6	7.3	12.3	8
13A2M	Desert Mountain	5600	4/24	39	14.6	15.5	13.0	15
Can 10	Fernie	3500	4/28	9	2.3	0.0	2.8	12
14A9	Griffin Creek Divide	5150	4/27	3í	8.5	7.0		_
14A3	Hell Roaring Divide	5770	4/18	83	35.1	34.4	28.7	15
13B13A	Holbrook	4530	4/28	8	1.6	0.0	1.6	7
13A3	Iceberg Lake #3	5600	5/3	76	37.4	24.6	27.1	15
13A14	Josephine Lower #9	4900	5/2	47	17.7	12.1	_	
14A5	Logan Creek	4300	4/21	9	3.2	0.0	3.3	13
13A5M	Marias Pass	5250	4/29	48	16.4	13.3	15.7	15
13A7	Mount Allen #7	5700	5/2	121	59.2	38.0	47.3	15
Can 10A	New Fernie	4100	4/28	31	10.2	0.0	6.4	7
13B7	North Fork Jocko	6330	5/3	121	55.7	40.7	46.0	8
13A6	Piegan Pass #6	5500	5/2	98	48.0	31.6	38.4	
13A8	Ptarmigan #8	5800	5/3	94	47.6	31.1	37.8	
13B2	Spotted Bear Mountain	7000	4/26	39	12.2	8.2	12.4	
13A10	Strawberry Lake	6500	5/1	110	48.0	44.1	41.3	
13B1	Trinkus Lake	6500	5/1	106	44.6	45.5	41.5	
13A12M	Trout Lake	3600	4/25	4	1.4	1.7	10.4	
14B1	TV Mountain	6800	5/4	57	20.5	13.4	_	_
13B11	Twin Creeks	3580	4/25	0	0.0	0.0	1.3	7
13B5	Upper Holland Lake	7000	5/1	92	37.0	36.4	36.5	7
14A7	Weasel Divide	5450	4/20	106	41.0	34.3	34.7	13
		- 1-	.,		·			
	•							

NOTE: ALL AVERAGES BASED ON 1943-1957 (15 YEAR PERIOD). "YEARS OF RECORD" INDICATED NUMBER OF YEARS USED IN 1943-1957 PERIOD.

### WATER SUPPLY OUTLOOK

## LOWER CLARK FORK RIVER BASIN MONTANA

AS OF i, 1961

### U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE.

The Water Supply Outlook for the Lower Clark Fork drainage is Fair to Good for the current irrigation season.

Snow surveys made near the first of May indicate the present snow-pack is 22 percent greater than it was last year and 109 percent of the 1943-57 average. However, the snow-pack is generally confined to the higher elevations.

Streamflow forecasts for the May through September period range from 69 percent average for the Clark Fork below Missoula to 88 percent average at Whitehorse Rapids near the Montana-Idaho line. In the upper reaches of the basin, the Clark\* Fork above Missoula is expected to flow about two-thirds normal, while the Flathead is forecast to produce near normal flow.

Report Prepared by

A. R. CODD AND P. E. FARNES
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
BOX 855 BOZEMAN, MONTANA



## WATER SUPPLY FORECASTS

AS OF MAY 1, 1961 - WATERSHED III

(±000 Acre Feet)	(	⊥00	0 A	cr	e	F	e	e	t	1
------------------	---	-----	-----	----	---	---	---	---	---	---

Γ		FORECAST POINT	FORECAST	FORECAST	3		SURED
-	410	N AME	PERIOD	THIS YEAR	NORMAL	LAST YEAR	
L	NO.	NAME				LAST YEAR	HORMAL
		DI AGUROOM DETER					
	3400	BLACKFOOT RIVER	) v 0- 1	(70	~~	(0)	470
	3400	Bonner (near)	May-Sept	679		636	879
			May-July May-June	595	76 76	553	783
		CLARK FORK RIVER	may-sune	496	70	472	655
	3404	Milltown (above) (14)	May-Sept	319	46	495	698
	J. ( )	11 (25000) (14)	May-July	271	45	400	600
			May-June	220	45	348	492
	3405	Missoula (above)	May-Sept	998	63	1131	1577
			May-July	866	63	953	1383
			May-June	716	62	820	1147
	3530	Missoula (below)	May-Sept	2054	69	2200	2950
			May-July	1834	69	1938	2648
	2515	G+ D + ( +)	May-June	1528	69	1695	2200
	3545	St. Regis (at)	May-Sept	2815	71	2930	3948
			May-July	2492	70	2571	3540
ı	3890	Plains (near) (18)	May-June May-Sept	2070 9576	70 88	2236 9233	2950 10837
	50,0	riains (near) (18)	May-July	8689	88	8220	9816
ı			May-June	7122	88	6880	8125
L	3920	Whitehorse Rapids (at)(19)		10723	88	10598	12144
ı			May-July	9605	88	9421	10975
ı			May-June	7926	88	7800	9027
L							
	(14) Di	fference in observed flow,	Clark Fork	borro Mis	י פונים	Janks at	at Danner
	(18) 0	served flow plus change in	storage in H	lathead I	oke & H	Tackloot	a Bonner
		served flow plus change in	storage in H	ungry Hor	se Reser	voir Fl	thead
	La	ke and Noxon Reservoir.			20 10001	, , , , , ,	Linda
		ovisional data furnished by	U. S. Geolo	gical Sur	vey.		

## RESERVOIR STORAGE DATA

	AS OF	APRIL 30, 1961			(1000 Acre Feet
		USABLE		MEASURED	
HO.	RESERVOIR	CAPACITY	THIS YEAR	LAST YEAR	HORMAL
3913	Noxon	200.1	48.6	185.6	-

NOTE: ALL NORMALS BASED ON 1943-1957 (15 YEAR PERIOD)

## SNOW SURVEY DATA

AS OF

MAY 1, 1961 - WATERSHED III

SNOW COURSE DATE SNOW WATER WATER CONTENT YE (Inches)			11111 29		T INFORMA	TION	PAST R	FCORD	1
15B1		SNOW COURSE			SNOW		WATER C	ONTENT	YEARS
15Bll Baree Creek 5500 5/2 110 53.0 43.2 - 15Bl Baree Mountain 6000 5/2 108 51.1 42.8 46.8 13BlO Coyote Hill 4200 4/28 7 2.7 0.9 2.2 15BlO Freezeout Summit 6800 4/27 96 38.6 29.2 36.3 15Cl Hoodoo Creek 6200 4/27 127 56.2 39.4 49.7 14C5 Lolo Pass 5230 5/1 64 28.0 28.4 29.9 15B2 Lookout 5250 5/1 83 37.8 33.7 31.8 13C8 Lubrecht Forest #6 4040 5/1 0 0.0 0.0 0.2 13B7 North Fork Jocko 6330 5/3 121 55.7 40.7 46.0	NO.	N AME	ELEVATION						DF RECDRD
	15B11 15B1 13B10 15C2 15B10 15C1 14C5 15B2 13C8 13B7	Baree Creek Baree Mountain Coyote Hill Fish Lake Airstrip Freezeout Summit Hoodoo Creek Lolo Pass Lookout Lubrecht Forest #6 North Fork Jocko	5500 6000 4200 5000 6800 6200 5230 5250 4040 6330	5/2 5/2 4/28 4/29 4/27 4/27 5/1 5/1 5/1	110 108 7 97 96 127 64 83 0	53.0 51.1 2.7 42.7 38.6 56.2 28.0 37.8 0.0 55.7	43.2 42.8 0.9 40.4 29.2 39.4 28.4 33.7 0.0 40.7	46.8 2.2 43.2 36.3 49.7 29.9 31.8	15 11 3 11 10 14 15 6

NOTE: ALL AVERAGES BASED DN 1943-1957 (15 YEAR PERIOD). "YEARS OF RECORD" INDICATED NUMBER OF YEARS USED IN 1943-1957 PERIOD.

### WATER SUPPLY OUTLOOK

## UPPER CLARK FORK RIVER BASIN MONTANA

MAY 1, 1961

### U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

The Water Supply Outlook for the Upper Clark Fork and Blackfoot River drainages is POOR to FAIR.

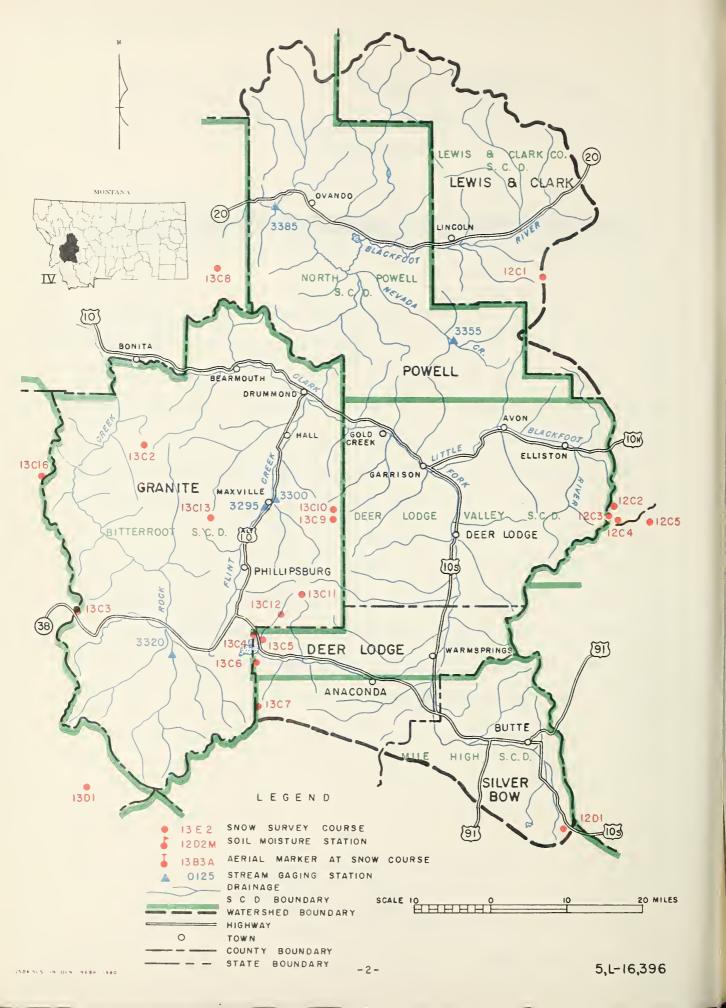
Proper management of limited water supply can mean the difference between profit or loss. There are many things that can be done with a deficient water supply to obtain maximum benefit. Before irrigating, clean ditches to reduce seepage and transfer losses. When irrigating, use as large a head as possible to reduce losses and wet only the root zone of the crop.

Snow surveys made on or about the first of May indicate the present snow-pack is 5 percent less than last year and 5 percent greater than the 1943-57 average. However, snow is confined to the higher elevations.

Water supply for the current irrigation season will be critical in the Upper Clark Fork drainage. Mountain soils are dry and will absorb much of the snowmelt. In the Blackfoot drainage, May through September flow is forecast to be slightly more than last year, with almost all of the water coming from the north portion of the area.

Report Prepared by \_

A. R. CODD AND P. E. FARNES
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
BOX 855 BOZEMAN, MONTANA



## WATER SUPPLY FORECASTS

AS OF MAY 1, 1961 - WATERSHED IV

					(100	O Acre Feet )
	FORECAST POINT	FORECAST	FORECAST	\$	MEAS	SURED
NO.	MAME	PERIOD	THIS YEAR	NORMAL	LAST YEAR	NORMAL
3295	FLINT CREEK Maxville (at)	May-Sept May-July	20.4	53 54	29.5 18.8	38.7 27.6
3300	BOULDER CREEK Maxville (at)	May-Sept May-July	15.8 14.3	60 60	15.8 14.2	26.4 24.0
3320	MIDDLE FORK ROCK CREEK Philipsburg (near)	May-Sept	47.1	62	51.2	75.6
3400	BLACKFOOT RIVER Bonner (near)	May-July May-Sept	41.6 679	62 77	45.3 636	67 <b>.</b> 6 879
	CLARK FORK RIVER	May-July May-June	595 496	76 76	553 472	783 655
3404	Milltown (above) (14)	May-Sept May-July May-June	319 271 220	46 45 45	495 400 348	698 600 492
(14) D:	fference in observed flow,	Clark Fork a	bove Miss	oula and	Blackfoo	t at
В	onner. rovisional data furnished by					

## RESERVOIR STORAGE DATA

AS OF APRIL 30, 1961

(1000 Acre Feet)

		USABLE		MEASURED	
NO.	RESERVOIR	CAPACITY	THIS YEAR	LAST YEAR	NORMAL
3250	Georgetown Lake	31.0	24.0	24.3	21.2

NOTE: ALL NORMALS BASED ON 1943-1957 (15 YEAR PERIOD)

USDA SCS-LINCOLN\_ NEBR\_ 1960

## SNOW SURVEY DATA

AS OF MAY 1, 1961 - WATERSHED IV

		CORRE	T INFORMA	ATION '	Y PAST R	ECORD `	1
SNOW COURSE		DATE	SHOW	WATER	WATER C	ONTENT	Y E 05
NAME	ELEVATION	SURVEY					RECORD
	6475 6200 7200 6900 7780 6250 6800 8000	DATE OF	SHOW DEPTH	13.9 1.5 5.0 8.3 15.3 3.6	10.0 2.5 6.5 7.6 13.2 4.6	ONTENT es] AVERAGE 2.6 3.3 8.7 15.6 3.6 9.0	15 13 15 12 15 15
	Ambrose Chessman Reservoir Pipestone Pass Stemple Pass Storm Lake Tenmile, Lower Tenmile, Middle	Ambrose 6475 Chessman Reservoir 6200 Pipestone Pass 7200 Stemple Pass 6900 Storm Lake 7780 Tenmile, Lower 6250 Tenmile, Middle 6800	Ambrose 6475 4/27 Chessman Reservoir 6200 4/27 Pipestone Pass 7200 5/1 Stemple Pass 6900 4/28 Storm Lake 7780 4/25 Tenmile, Lower 6250 4/29 Tenmile, Middle 6800 4/29	Ambrose 6475 4/27 44 Chessman Reservoir 6200 4/27 12 Pipestone Pass 7200 5/1 13 Stemple Pass 6900 4/28 31 Storm Lake 7780 4/25 55 Tenmile, Lower 6250 4/29 13 Tenmile, Middle 6800 4/29 36	Ambrose 6475 4/27 44 13.9 Chessman Reservoir 6200 4/27 12 1.5 Pipestone Pass 7200 5/1 13 5.0 Stemple Pass 6900 4/28 31 8.3 Storm Lake 7780 4/25 55 15.3 Tenmile, Lower 6250 4/29 13 3.6 Tenmile, Middle 6800 4/29 36 10.4	Ambrose 6475 4/27 44 13.9 10.0 Chessman Reservoir 6200 4/27 12 1.5 2.5 Pipestone Pass 7200 5/1 13 5.0 6.5 Stemple Pass 6900 4/28 31 8.3 7.6 Storm Lake 7780 4/25 55 15.3 13.2 Tenmile, Lower 6250 4/29 13 3.6 4.6 Tenmile, Middle 6800 4/29 36 10.4 10.5	Ambrose 6475 4/27 44 13.9 10.0 - Chessman Reservoir 6200 4/27 12 1.5 2.5 2.6 Pipestone Pass 7200 5/1 13 5.0 6.5 3.3 Stemple Pass 6900 4/28 31 8.3 7.6 8.7 Storm Lake 7780 4/25 55 15.3 13.2 15.6 Tenmile, Lower 6250 4/29 13 3.6 4.6 3.6 Tenmile, Middle 6800 4/29 36 10.4 10.5 9.0

NOTE: ALL AVERAGES BASED ON 1943-1957 (15 YEAR PERIOD). "YEARS OF RECORD" INDICATED NUMBER OF YEARS USED IN 1943-1957 PERIOD.

# BITTERROOT RIVER BASIN MONTANA

AS OF: MAY 1, 1961

#### U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

The Water Supply Outlook for the Bitterroot River drainage is Fair for the current irrigation season.

Streamflow forecasts for the irrigation season are about the same, percentagewise, as last month, due to below normal streamflow during April.

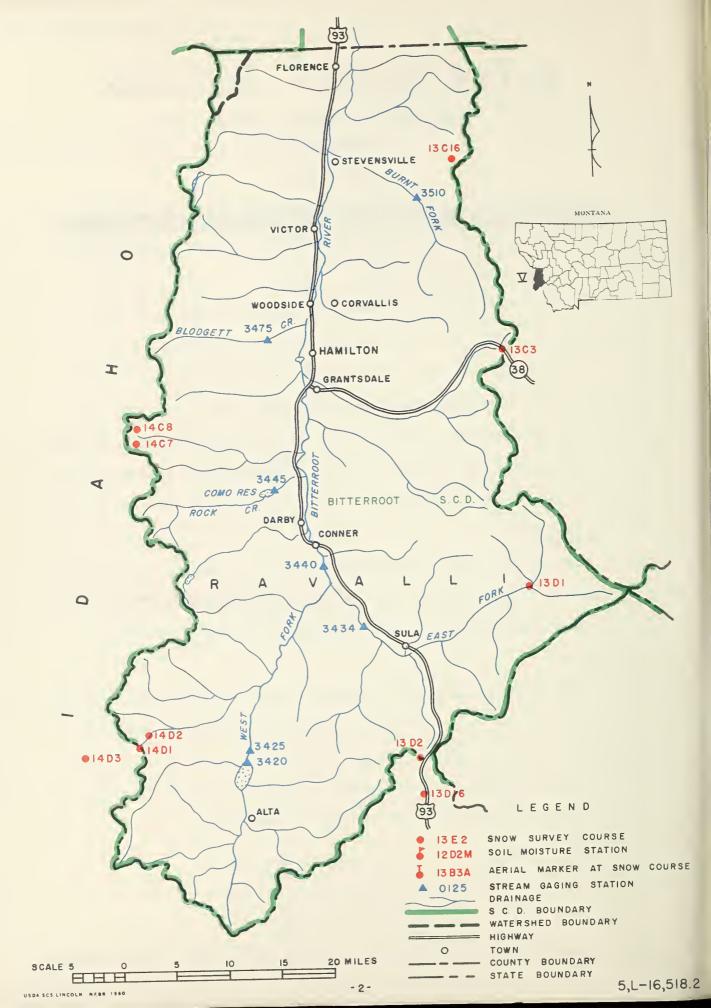
Proper management of a limited water supply can mean the difference between profit or loss. Even with a deficient water supply many things can be done to obtain maximum benefit. Before irrigating, clean ditches to reduce seepage and transfer losses. When irrigating, use as large a head as possible to reduce losses and wet only the root zone of the crop being irrigated.

Snow surveys made on or near the first of May indicate that snow is confined to high elevations. The present snow-pack over the basin is 5 percent greater than last year and 5 percent less than the 1943-57 average.

Streamflow for the current irrigation season will be below average and generally less than last year. The Bitterroot River at Darby is forecast to flow 75 percent average, or 16 percent less than last year for the May through September period. Burnt Fork Creek is expected to flow about two-thirds normal for the next five months.

A. R. CODD AND P. E. FARNES
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
BOX 855 BOZEMAN, MONTANA

USDA SCS LINCOLN NEBR 1960



A	S	0	F
~	•	_	1

		MAY 1, 1961	- WATER	SHED V	(1000	Acre Feet)
	FORECAST POINT	FORECAST	FORECAST	5	MEAS	URED
NO.	NAME	PERIOD	THIS YEAR	NORMAL	LAST YEAR	+ NORMAL
	WEST FORK BITTERROOTRIVE	R				
3425	Conner (near) (15)	May-Sept		69	-	153
		May-July	97	59	-	141
2440	BITTERROOT RIVER	Mary Cont	389	75	453	519
3440	Darby (near)	May-Sept May-July			412	479
		May-June			367	409
3528	Missoula (near) (16)	May-Sept	L.		1069	1379
		May-July	968		985	1272
		May-June	812	76	875	1066
	BLODGETT CREEK		2,	do	30.5	41.9
3475	Corvallis (near)	May-Sept			29.6	39.6
	BURNT FORK CREEK	May-July	52.0	رد	29.0	37.0
3510	Stevensville (near)	May-Sept	19.0	66	_	28.6
	buckens ville (modi)	May-July			_	25.3
		, and a	[			
(25)	0)		West For	Ritton	root River	Regervo
(15) (16)	Observed flow plus change i Difference in observed flow	Clark Fork	shove and	pelow	Missoula	. Reservo
(10)	Provisional data furnished	by H S Gool	ogical s	IMMON	in o o o o o o o o o o o o o o o o o o o	

#### RESERVOIR STORAGE DATA

AS OF

	1				(1000 Acre Feet
		USABLE		MEASURED	
NO.	RESERVOIR	CAPACITY	THIS YEAR	LAST YEAR	NORMAL

NOTE: ALL NORMALS BASED ON 1943-1957 (15 YEAR PERIOD)

AS OF MAY 1, 1961 - WATERSHED V

				IT INFORMA	TION	PAST R	ECORD	,
SNOW COURSE			DATE	SNOW	WATER	WATER C	ONTENT	YEARS
NO.	NAME	ELEVATION		(Inches)	(Inches)			
13C16 13D2 14C5 14C7 14D2 14D1 14C8	Ambrose Gibbons Pass Lolo Pass Lost Horse Nez Perce Camp Nez Perce Pass Twin Lakes	6475 7100 5230 5940 5580 6575 6510		SNOW DEPTH (Inches) 44 52 64 90		10.0 17.2 28.4 28.1 10.0	ONTENT es)	0F RECORD - 15 14 - 13

NOTE: ALL AVERAGES BASED ON 1943-1957 (15 YEAR PERIOD). "YEARS OF RECORD" INDICATED NUMBER OF YEARS USED IN 1943-1957 PERIOD.

MARIAS, TETON, & SUN RIVER BASINS
MONTANA

AS OF: MAY 1, 1961

#### U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

The Water Supply Outlook for the Marias, Sun and Teton River drainages for the current irrigation season is GOOD.

Snow surveys made near the first of May indicate the present snow-pack is 50 percent greater than last year, and 25 percent greater than the 1943-57 average; however, the snow is confined to the higher elevations.

Streamflow into Gibson Reservoir is forecast to be 15 percent above last year for the May through September period. On the Marias River the May through September flow is forecast to be 30 percent greater than last year.

Generally, irrigation reservoir storage is less than last year.

A. R. CODD AND P. E. FARNES
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
BOX 855 BOZEMAN, MONTANA



AS OF MAY 1, 1961 - WATERSHED VI (1000 Acre Feet) MEASURED FORECAST POINT FORECAST FORECAST 5 THIS YEAR PERIOD NORMAL LAST YEAR NORMAL NO. HAME N. FORK OF N. FORK SUN 0785 Augusta (near) May-Sept 185 82 146 225 May-July 168 131 207 81 SUN RIVER 0786 Gibson Dam (at) May-Sept 450 82 391 551 May-July 350 406 81 501 MARIAS RIVER 0995 366 Shelby (near) May-Sept 485 83 581 May-July 438 83 339 527

#### RESERVOIR STORAGE DATA

(+) Privisional data furnished by U. S. Geological Survey.

AS OF	APRIL 30.	1961		

	(1000 ACF					
		USABLE	MEASURED			
NO.	RESERVOIR	CAPACITY	THIS YEAR	LAST YEAR	NORMAL	
1013 0955 0805 0795 0820 0940	Tiber Lake Francis Pishkun Gibson Willow Creek Swift	1316.0 112.0 32.0 105.0 32.3 30.0	662.6 80.0 26.4 34.1 25.6 18.7	657.7 101.7 29.4 82.7 26.8 30.1	- 99.9 20.7 70.6 21.1 27.3	

NOTE: ALL NORMALS BASED ON 1943-1957 (15 YEAR PERIOD)

AS OF

MAY 1, 1961 - WATERSHED VI

		CURREN	IT INFORMA	TION	PAST RI	ECORD		
	SNOW COURSE		DATE	SNOW DEPTH	WATER CONTENT	WATER CO		Y E AR S OF
NO.	NAME	ELEVATION	SURVEY		(Inches)	LAST YEAR		RECORD
12B7 13A3 13A12 13A5N 13A7 13A6 13A8	Goat Mountain Iceberg Lake #3 Josephine Lower #9	7000 5600 4900 5250 5700 5500 5800		(Inches)		5.6 24.6 12.1 13.3 38.0 31.6		15 15 15 15

NOTE: ALL AVERAGES BASED ON 1943-1957 (15 YEAR PERIOD). "YEARS OF RECORD" INDICATED NUMBER OF YEARS USED IN 1943-1957 PERIOD.

MISSOURI RIVER (MAIN STEM) BASIN
MONTANA

AS OF: MAY 1, 1961

#### U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

The Water Supply Outlook for tributary streams to the Main Stem Missouri is Poor for the current irrigation season.

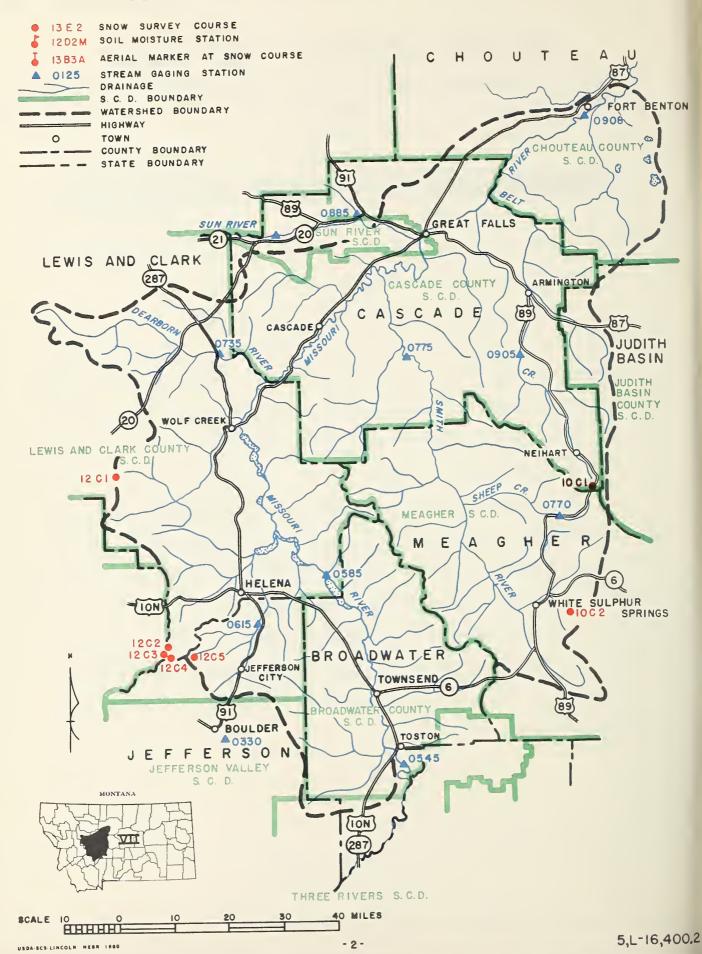
Proper management of limited water supply can mean the difference between profit or loss. Even with a deficient water supply many things can be done to obtain maximum benefit. Before irrigating, clean ditches to reduce seepage and transfer losses. When irrigating, use as large a head as possible to reduce losses and wet only the root zone of the crop being irrigated.

Snow surveys made on or near the first of May indicate that snow is confined to higher elevations. Over the basin, the present snow-pack is 8 percent less than last year and the same percentage of the 1943-57 average. Soil under the snow-pack is dry.

Streamflow during the current irrigation season will be deficient on the tributary streams such as Prickly Pear, Tenmile, Sheep and the Smith River. Streamflow in the Missouri is forecast at slightly less than last year.

Report Prepared by

A. R. CODD AND P. E. FARNES
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
BOX 855 BOZEMAN, MONTANA



AS OF MAY 1, 1961 - WATERSHED VII

(1000 Acre Feet)

	FORECAST POINT	FORECAST	FORECAST	\$		SURED
нО.	N AME	PERIOD	THIS YEAR	NORMAL	LAST YEAR	HORMAL
0545 0908 1095 1150 1320 1770 3300	MISSOURI RIVER Toston (at) (3)  Fort Benton (at) (5)  Virgelle (at) (6)  Zortman (near) (6)  Ft. Peck Dam (below)(7)  Wolf Point (near) (7)  Williston, N. D. (8)  PRICKLY PEAR CREEK Clancy (near)	May-Sept May-July	1327 1114 1955 1580 2242 1865 2461 2012 2309 1933 2376 1983 5440 4497	66 66 63 61 59 58 59 58 57 56 56 54 51 49 48 47	1355 1108 1963 1572 2342 1929 2627 2152 2211 1932 2306 2013 4700 4149 16.4	2006 1693 3098 2575 3799 3209 4140 3477 4027 3446 4256 3647 10565 9144 20.7 17.6
(5) Obs (6) Obs (7) Obs Res (8) Obs Buf	erved flow plus change in served flow plus change in served flow plus change in served flow plus change in servoirs.  erved flow plus change in served flow plus change in server served flow plus change in server	torage in Car torage in Car torage in Car torage in For pirs.	yon Ferr yon Ferr yon Ferr	y. y and Til y, Tiber Canyon Fe	er Reser and Fort	Peck

#### RESERVOIR STORAGE DATA

AS OF APRIL 30, 1961

(1000 Acre Feet)

		USABLE		MEASURED	
NO.	RESERVOIR	CAPACITY	THIS YEAR	LAST YEAR	NORMAL
0585 0645 0660 0650 1315	Canyon Ferry Lake Helena Holter Lake Hauser Lk & Lk Helena Fort Peck Smith River	2043.0 10.4 81.9 61.9 19410.0 10.7	1432.0 10.3 74.9 60.7 11000.0 6.0	1942.0 9.2 79.0 57.9 11640.0	1353.0 5.1 57.1 46.5 12003.0 10.3

NOTE: ALL NORMALS BASED ON 1943-1957 (15 YEAR PERIOD)

AS OF MAY 1, 1961 - WATERSHED VII

NOTE: ALL AVERAGES BASEO ON 1943-1957 (15 YEAR PERIOD). "YEARS OF RECORO" INDICATED NUMBER OF YEARS USED IN 1943-1957 PERIOD.

BEAVERHEAD, & JEFFERSON RIVER BASINS

MONTANA

AS OF: MAY 1, 1961

#### U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

The Water Supply Outlook for the Beaverhead and Jefferson River basins is Poor for the current irrigation season.

Proper management of limited water supply can mean the difference between profit or loss. With a deficient water supply many things can be done to obtain maximum benefit. Before irrigating, clean ditches to reduce seepage and transfer losses. When irrigating, use as large a head as possible to reduce losses and wet only the root zone of the crop.

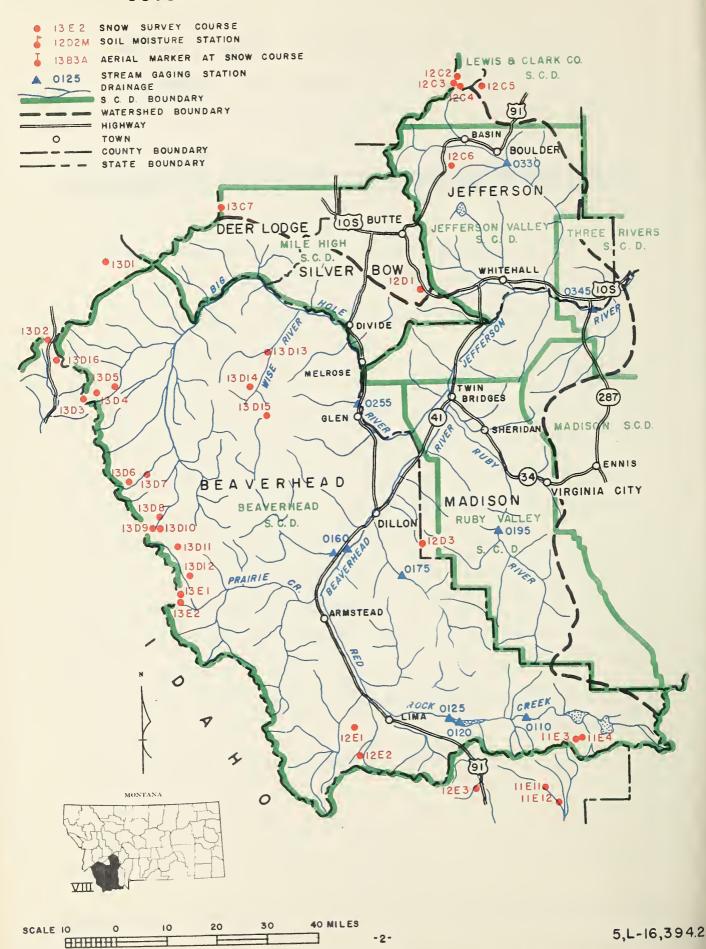
Snow surveys made near the first of May indicate the present snow-pack is 7 percent greater than it was at this time last year and 6 percent less than the 1943-57 average. Snow is confined to the higher elevations and soil beneath the snow-pack is dry.

Streamflow forecasts for the five-month period, May through September, generally are less than last year. In the Red Rock drainage, May through September flow is expected to be about 50 percent of average. In the Big Hole and Boulder drainages, flow is forecast to be only two-thirds the 1943-57 average.

Reservoir storage for May first has improved but is below average.

A. R. CODD AND P. E. FARNES
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
BOX 855 BOZEMAN, MONTANA

USDA-SCS LINCOLN NEBR 1960



AS OF MAY 1, 1961 - WATERSHED VIII

					O Acre Feet)	
	FORECAST POINT	FORECAST	FORECAST	\$	MEA	SURED
NO.	NAME	PERIOD	THIS YEAR	NORMAL	LAST YEAR	N OR M AL
	DED DOOR DEED					
0110	RED ROCK RIVER Kennedy Ranch (at)	Man Caut	2/ /	,,	000.0	I
	Rennedy Ranch (gt)	May-Sept May-July	26.6 23.6	49 48	27.8	54.9 49.1
0125	Monida (near) (1)	May-Sept	30.3	49	24.4	62.3
	DE AMBRICA DE COMO	May-July	28.1	48	23.3	58.1
0160	BEAVERHEAD RIVER Barratts (at) (1)	Mars Court				
0100	Dallacos (ac) (1)	May-Sept) May-July)	No Fo	recast (	B)	
	BIG HOLE RIVER					
0255	Melrose (near)	May-Sept	438	66	440	668
	BOULDER RIVER	May-July	397	65	397	611
0330	Boulder (near)	May-Sept	44.1	64	59.9	69.4
		May-July	42.2	64	56.9	66.0
0345	JEFFERSON RIVER	, a .	7/0	/=		
0545	Sappington (at)	May-Sept May-July	560 482	61 60	570 487	913 798
		nay cary	40~		457	770
					1	
(B) For	ecasts discontinued at this	station bec	ause the	large nu	mber of u	nmeasured
div	ersions above the station d	etermine the	flow.			
(1) Obs	erved flow plus change in s visional data furnished by	Torage in Li	na Keserv	oir.		
( ' / 110	l solution and salid strained by	o. D. Geologi	real bury	ey.		

#### RESERVOIR STORAGE DATA

AS OF APRIL 30, 1961

(1000 Acre Feet

					(1000 Acre Feet
		USABLE	MEASURED		
NO.	RESERVOIR	CAPACITY	THIS YEAR	LAST YEAR	NORMAL
0120	Lima Ruby	84.0 38.8	23.6 31.6	54.8	58.1 22.1

NOTE: ALL NORMALS BASED ON 1943-1957 (15 YEAR PERIOD)

USDA SCS-LINCOLN NEBR. 1940 -3- 5,L-16,395.1

AS OF MAY 1, 1961 - WATERSHED VIII

			CURREN	T INFORMA	TION	PAST R	ECORD	,
	SNOW COURSE		DATE	SHOW	WATER CONTENT	WATER C	ONTENT	YEARS
нО.	NAME	ELEVATION	OF SURVEY	DEPTH (Inches)	(Inches)	LAST YEAR		OF RECORD
12C5 13D15 13D2 11E4 11E3 12D1 13C7 12C2 12C3 12C4	Chessman Reservoir Elk Horn Gibbons Pass Lakeview Canyon Lakeview Ridge Pipestone Pass Storm Lake Tenmile, Lower Tenmile, Middle Tenmile, Upper	6200 8450 7100 6930 7400 7200 7780 6250 6800 8000	4/27 5/1 4/28 4/27 4/27 5/1 4/29 4/29 4/29	12 24 52 25 21 13 55	1.5 6.9 20.4 7.8 6.0 5.0 15.3 3.6 10.4 14.0	2.5 5.8 17.2 5.0 3.1 6.5 13.2 4.6 10.5 15.9	2.6 8.7 23.0 10.1 7.6 3.3 15.6 9.0 12.7	15 9 15 7 7 13 12 15 15

NOTE: ALL AVERAGES BASED ON 1943-1957 (15 YEAR PERIOD). "YEARS OF RECORD" INDICATED NUMBER OF YEARS USED IN 1943-1957 PERIOD.

Madison & Gallatin River Basins

Montana as of: May 1, 1961

#### U. S. Department of Agriculture - Soil Conservation Service

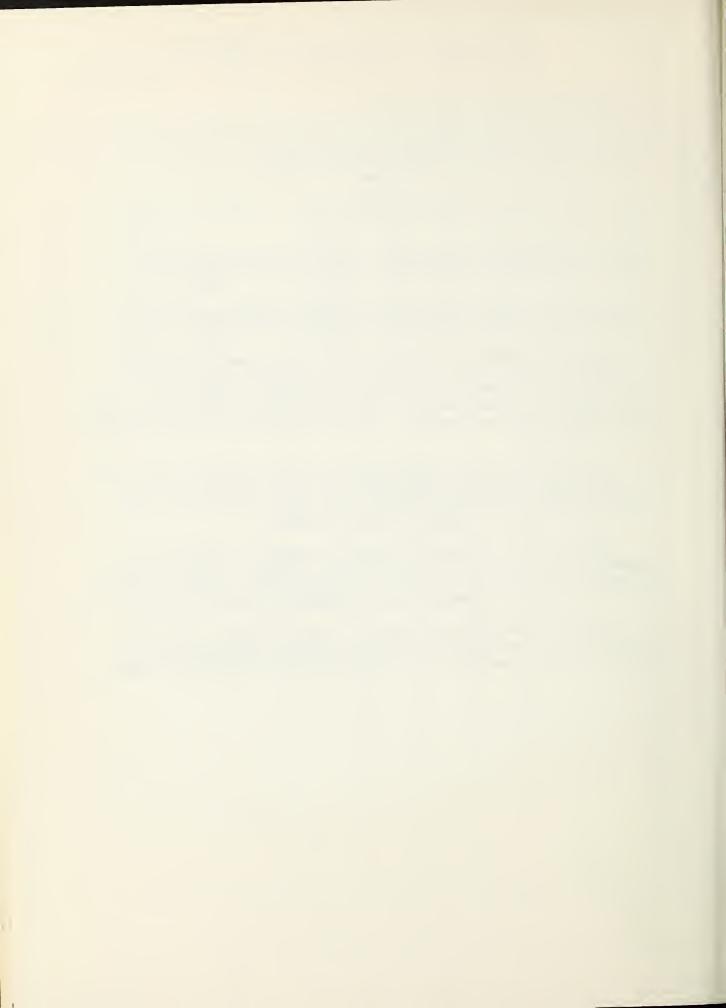
The Water Supply Outlook for the current irrigation season in the Madison and Gallatin River basins is Fair to Poor.

Proper management of limited water supply can mean the difference between profit or loss. Even with a deficient water supply many things can be done to obtain maximum benefit. Before irrigating, clean ditches to reduce seepage and transfer losses. When irrigating, use as large a head as possible to reduce losses and wet only the root zone of the crop.

Snow surveys made on or about the first of May indicate the snow-pack is confined to higher elevations and overlies dry soil. Over these two basins, the present snow-pack is 33 percent greater than last year and 9 percent above the 1943-57 average.

Streamflow for the current irrigation season is relatively unchanged from last month, due to low runoff in April. The May through September forecasts in the Gallatin drainage are less than last year's, while the Madison is forecast to flow slightly more than last year.

Tributary streams to the Madison, such as Jack Creek and Cedar Creek, are expected to produce a somewhat better flow than the East side stream, but flow will be deficient during the irrigation season.



AS OF MAY 1, 1961 - WATERSHED IX (1000 Acre Feet)

	FORECAST POINT	FORECAST	FORECAST	5	MEAS	SURED
NO.	NAME	PERIOD	THIS YEAR	N OR M A L	LAST YEAR	NORMAL
0375	MADISON RIVER	) ( ) ( ) ( )	7.0	70	7,7	2.00
0575	West Yellowstone (near)	May-Sept May-July	148 105	79 77	141	187 136
0385	Grayling (near) (2)	May-Sept	309	79	265	389
-		May-July	231	78	185	298
0410	McAllister (near)(3)	May-Sept	537	81	514	659
	WEST GALLATIN RIVER	May-July	421	81	374	516
0435	Gateway (near)	May-Sept	338	78	379	431
0433	da sonaj (noar)	May-July	283	77	315	367
0500	Hyalite Cr. R.S.(at)(4)	May-Sept	27.2	82	32.0	33.2
	7.00 0.17.000	May-July	23.1	82	27.2	28.2
0480	EAST GALLATIN RIVER		20.0	<i>=1</i>	22 "	200 0
0460	Bozeman (at)	May-Sept May-July	20.9	56 57	33.5	37.2 31.5
	GALLATIN RIVER	May-July	17.7	27	27.0	21.0
0525	Logan (at)	May-Sept	282	66	340	427
		May-July	232	65	272	356
(2) Ob:	served flow plus change in s	torage in Hel	gen Lake			
(3) Ob:	served flow plus change in s	torage in Hel	gen and	Ennis La	kes.	
	served flow plus change in sovisional data furnished by I					
(i) FF	by total data furnished by	o. S. Georogi	LUEI SULV	ey.		
1						

#### RESERVOIR STORAGE DATA

AS OF APRIL 30, 1961 (1000 Acre Feet) MEASURED USABLE CAPACITY LAST YEAR HORMAL NO. RESERVOIR THIS YEAR 0380 Hebgen Lake 182.4 212.1 345.0 10.5 0405 41.0 37.6 Ennis Lake 35.7 34.4 4.6 0500 Middle Creek 8.0 4.3 5.2

NOTE: ALL NORMALS BASED ON 1943-1957 (15 (EAR PERIOD)

AS OF MAY 1, 1961 - WATERSHED IX

			CURREN	IT INFORMA	TION	PAST R	ECORD	
	SNOW COURSE		DATE	SNOW	WATER	WATER C	ONTENT	YEARS
NO.	NAME	ELEVATION	OF SURVEY	OEPTH (Inches)	(Inches)			OF RECORD
10D4 11E5 10D3 10E2 10D10 11E6 11E7	Devil's Slide Hebgen Hood Meadow Norris Basin Sacajawea Twenty-One Mile West Yellowstone	8100 6550 6600 7500 6550 7150 6700	4/26 4/27 4/25 5/1 4/29 4/27 4/27	78 15 26	23.6 4.9 7.6 5.7 11.1 16.4 5.4	27.2 0.0 6.4 4.2 13.7 9.8 0.0		15 15 15 4 -

NOTE: ALL AVERAGES BASED ON 1943-1957 (15 YEAR PERIOD). "YEARS OF RECORD" INDICATED NUMBER OF YEARS USED IN 1943-1957 PERIOD.

# WATER SUPPLY OUTLOOK Judith & Musselshell River Basins

Montana

as of:

May 1, 1961

#### U. S. Department of Agriculture - Soil Conservation Service

The Water Supply Outlook for the Judith and Musselshell River basins for the current irrigation season is Poor.

Proper management of limited water supply can mean the difference between profit or loss. Even with a deficient water supply, many things can be done to obtain maximum benefit. Before irrigating, clean ditches to reduce seepage and transfer losses. When irrigating, use as large a head as possible to reduce losses and wet only the root zone of the crop.

The May first snow survey at Kings Hill showed that the water content is 10 percent below last year and 10 percent below the 1943-57 average. Snow is confined entirely to higher elevations.

During the next 5 months, streamflow in the Judith and Musselshell drainages is expected to be less than last year, with extremely deficient flow later in the season. It is possible that some of the streams in this area will be dry in late July and August.



AS OF MAY 1, 1961 - WATERSHED X

1:000 Acre Feet I

		29 2/02 112222002222			(±000 Acre Feet	
	FORECAST POINT	FORECAST	FORECAST	\$	MEA	SURED
NO.	N AME	PERIOD	THIS YEAR	NORMAL	LAST YEAR	N OR M AL
(9) Obse	MUSSELSHELL RIVER South Fork Martinsdale (above)  Harlowton (at) (9)  MISSOURI RIVER Virgelle (at) (6)  Zortman (near) (6)  Prved flow plus change in strictly strict	orage in Dur	and and M	artinsda	25.8 24.2  2342 1929 2627 2152	46.3 44.2 68.2 67.2 3799 3209 4140 3477

#### RESERVOIR STORAGE DATA

AS OF APRIL 30, 1961

(1000 Acre Feet)

		USABLE	MEASURED		
NO.	RESERVOIR	CAPACITY	THIS YEAR	LAST YEAR	NORMAL
1190 1165 1105 1225	Martinsdale Durand Ackley Deadman's Basin	23.1 7.0 5.8 52.5	4.4 4.7 4.1 44.4	12.0 7.0 4.6	11.4 6.2 4.3 49.4

NOTE: ALL NORMALS BASED ON 1943-1957 (15 YEAR PERIOD)

AS OF MAY 1, 1961 - WATERSHED X

			CURREN	IT INFORMA	TION	PAST R	ECORD	
	SNOW COURSE		DATE OF	SHOW DEPTH	WATER	WATER CO	ONTENT	YEARS OF
NO.	NAME	ELEVATION	SURVEY	DEPTH (Inches)	(Inches)	LAST YEAR	AVERAGE	RECORD
1001	Kings Hill	7950	4/28	46	12.4	13.7	13.7	11
					) Pic			v .

NOTE: ALL AVERAGES BASED ON 1943-1957 (15 YEAR PERIOD). "YEARS OF RECORD" INDICATED NUMBER OF YEARS USED IN 1943-1957 PERIOD.

UPPER YELLOWSTONE RIVER BASIN

#### MONTANA

AS OF: MAY 1, 1961

#### U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

The Water Supply Outlook for the Upper Yellowstone drainage for the current irrigation season is Fair to Poor.

Proper management of a limited water supply can mean the difference between profit or loss. Many things can be done with a deficient water supply to obtain maximum benefit. Before irrigating, clean ditches to reduce seepage and transfer losses. When irrigating, use as large a head as possible to reduce losses and wet only the root zone of the crop.

Snow surveys made on or near the first of May indicate that snow is confined to the higher elevations.

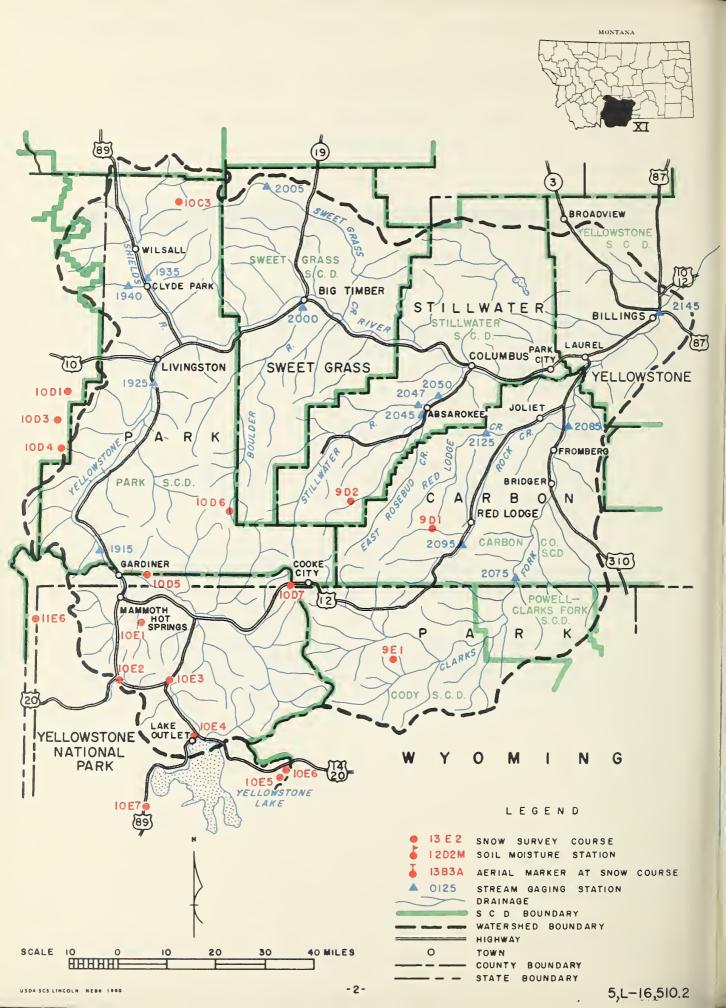
In the Upper Yellowstone area, the present snow-pack is 23 percent greater than last year, and 87 percent of the 1943-57 average. Very little snowmelt occurred during April, and that which did melt was absorbed by the dry soil.

Streamflow in the Yellowstone River during the next five months is expected to be slightly more than for this same period last year. The irrigation season's flow in Rock Creek is expected to be critically low; the May through September flow is expected to be about 13 percent less than last year.

Streamflow during the month of April was low, with the Yellowstone River at Corwin Springs flowing only 55 percent of the 1943-57 average. Rock Creek near Red Lodge Creek had a flow of 53 percent average, while streamflow of the Yellowstone River at Billings was only 33 percent average.

Report Prepared by

A. R. CODD AND P. E. FARMES
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
BOX 855 BOZEMAN, MONTANA



AS OF MAY 1, 1961 - WATERSHED XI

(1000 Acre Feet)

	FORECAST POINT	FORECAST	FORECAST	\$	T	SURED
NO.	NAME	PERIOD	THIS YEAR	NORMAL	LAST YEAR	HORMAL
	WELL OLIGHONE DETERM					
1915	YELLOWSTONE RIVER Corwin Springs (at)	May-Sept	1374	73	1228	1888
-/-/	bpings (at)	May-July	1127	72	1014	1557
1925	Livingston (near)	May-Sept	1523	71	1413	2136
27.45	D.224	May-July	1217	70	1159	1747
2145	Billings (at)	May-Sept	2512	63	2316	3998
3090	Miles City (at) (13)	May-July May-Sept	2131 3065	63 50	1966 2526	3393 6182
1 30,0	112103 0103 (40) (13)	May-July	2665	50	2198	5343
3295	Sidney (near) (13)	May-Sept	2855	45	2252	6362
		May-July	2438	45	2050	5430
1025	SHIELDS RIVER					
1935	Clyde Park (at)	May-Sept	58.4	63	51.5	92.5
	ROSEBUD CREEK	May-July	53.1	63	46.8	84.8
2045	Absarokee (near) (12)	May-Sept	134	52	124	255
		May-July	106	52	101	204
2000	STILLWATER RIVER					
2050	Absarokee (near) (12)	May-Sept	328	55	318	594
	CLARKS FORK RIVER	May-July	275	55	265	497
2075	Chance (at)	May-Sept	412	70	363	590
		May-July	361	69	340	525
2085	Edgar (at)	May-Sept	414	67	361	616
	ROCK CREEK	May-July	362	67	325	540
2095	Red Lodge (near)	May-Sept	60.2	E E	68.6	7.00
1	nod Bodge (near)	May-July	44.9	55 54	49.9	109 83.6
		JJ	77.7	74	47.7	0,0
(10) 0	1 02					
(12) Ob.	served flow plus change in	torage in My	stic Lak	9.		
(+) Pr	served flow plus change in a pvisional data furnished by	W. S. Geolog	ical Sun	II & Boy	sen Keser	voirs.
\ /	de sa l'alliabilità by	0. D. G60108	TOOL DUIT	voy.		

## RESERVOIR STORAGE DATA

AS OF APRIL 30, 1961

(1000 Acre Feet)

		USABLE		MEASURED				
но.	RESERVOIR	CAPACITY	THIS YEAR	LAST YEAR	HORMAL			
2040 2120	Mystic Lake Cooney Reservoir	20.8 27.5	4.8 8.2E	5.7 -	3.3 14.7			
E - Est	imated.				,			

NOTE: ALL NORMALS BASED ON 1943-1957 (15 YEAR PERIOD)

# SNOW SURVEY DATA AS OF MAY 1, 1961 - WATERSHED XI

			CURREN	T INFORMA	TION	PAST R	ECORD	)
	SNOW COURSE		DATE OF	SNOW DEPTH	WATER CONTENT	WATER C	ONTENT	YEARS OF
NO.	N AME	ELEVATION	SURVEY		(Inches)	LAST YEAR		RECORD
9D1 10E3 10D7 10D4 10E6 9D3 9D5 10D3 10D6 10E4 9E1 10D12 10E2 10D10 10E5 9D4	Camp Senia Canyon Cooke City Devil's Slide East Entrance Gertrude Lake Grizzly Peak Hood Meadow Independence Lake Camp Lodgepole Lupine Creek Monument Peak Norris Basin Sacajawea Sylvan Pass Timberline Creek	7890 7500 7400 8100 7000 9250 8400 6600 8000 7300 9000 7500 6550 7100 8850	4/27 4/30 4/29 4/26 4/27 4/26 4/25 4/28 4/30 5/1 4/28 5/1 4/29 5/1 4/27	19 37 22 78 0 43 50 26 49 24 26 20 74 21 34 27 47	4.6 10.0 6.6 23.6 0.0 12.2 7.6 16.8 5.9 6.8 26.2 5.7 11.1 8.6 12.4	- 8.7 4.1 27.2 0.0 - 6.4 - 5.5 0.0 - 4.2 13.7 5.0	11.7 6.2 23.4 4.7 - 5.5 - 8.3 11.0 7.8 - 5.6 10.0	9 12 15 4 - 15 - 10 14 6 - 10

NOTE: ALL AVERAGES BASED ON 1943-1957 (15 YEAR PERIOD). "YEARS OF RECORD" INDICATED NUMBER OF YEARS USED IN 1943-1957 PERIOD.

#### STATUS OF RESERVOIR STORAGE

#### MAY 1, 1961

BASIN		USABLE	USABLE S	TORAGE - 1	000 ACRE FEE	T
& STREAM	RESERVOIR	CAPACITY 1000 A.F.	1961	1960	1943-57 Average	Yrs.
MISSOURI RIVER E	BASIN - WYOMING					
Shoshone River Wind River Wind River Bull Creek Belle Fourche	Buffalo Bill Boysen Pilot Butte Bull Lake Key Hole	372.5 560.0AC 31.6 152.0 190.3AC	117.5 92.7 27.4 56.5 2.7	130.3 146.5 21.8 32.4 11.8	230.3 207.1 23.0 53.5 13.5	15 5 15 15 6
MISSOURI RIVER E	BASIN - NORTH DAKOTA	<u>1</u>				
Heart River Heart River Missouri River James River	Lake Tschida E. A. Patterson Garrison Lake Jamestown	68.7AC 5.6AC 18100.0AC 20.0AC	49.7 4.1 4247.8 16.1	69.9 5.3 5538.4 16.5	66.6	8 7 -
MISSOURI RIVER E	BASIN - SOUTH DAKOTA	$ar{I}$				
Belle Fourche Cheyenne River Cheyenne River Grand River Missouri River Missouri River Missouri River Cheyenne River	Belle Fourche Angostura Deerfield Shadehill Ft. Randall Gavins Point Oahe Pactola	185.2AC 90.0AC 15.1AC 84.0AC 3800.0AC 320.0AC 17000.0AC 55.0AC	42.3 7.2 3.1 - 2400.0 213.0 2495.0T 15.6	72.1 30.0 2.4 81.4 3418.1 306.6 3192.0T 26.0	132.9 53.0 13.7 86.8	15 6 10 6 -

AC Active Capacity; USBR Billings. T Total Storage.



#### WYOMING SNOW SURVEYS ABOUT MAY 1, 1961

		·			11		
			1				Years
Snow Course							Record
Name	Elev.	Survey	(In.)	(In.)	Year	Average	Used in
						1943-57	Average
R YELLOWSTONE - WIND F	RIVER						
Big Warm	8800	1./26	10	5.7	0.7	7 8**	6
							12
		1/20				• •	12
		1/25			9.0	14.0	1~
		1/20			3.0	7 8**	12
		1/26			11		
							19
	-	4/27			11	1	12
		4/27					12
			5		3:1		6
							18
					27.0	33.2**	7
Twenty Lakes	10000	4/25	26	6.5E			
R YELLOWSTONE - POPO A	GIE RIVE	<u>R</u>					
Blue Ridge	9500	1/23	32	7.6	2.4	13.6	21
		1/23	4				4
	-					21 1**	12
				4	14		16
-					III		21
	-	4/23			15		21
	-	4/23		1	11		
	•						17
Trout Greek	8400	5/1	0	T•T	0.0	2.9**	12
R YELLOWSTONE - OWL CF	REEK				The second secon		
Owl Creek	8700	4/27	36	8.3	9.3	7.6**	12
R YELLOWSTONE - GREYBU	JLL RIVER				1		
Timber Creek #2	8800	4/27	11	3.7	2.9	4.2**	6
						4.6*E	18
R YELLOWSTONE - SHOSHO	NE RIVER						
Carter Mountain	7800	4/28	16	4.7	3.8		2
	Big Warm Burroughs Creek Dinwoodie Dinwoodie Glaciers Dry Creek DuNoir Geyser Creek Little Warm Sheridan R.S. #2 T-Cross Ranch Togwotee Pass Twenty Lakes  R YELLOWSTONE - POPO A  Blue Ridge Bruce's Camp Hobbs Park Mosquito Park R.S. Sawmill Glade South Pass St. Lawrence R.S. Trout Creek  R YELLOWSTONE - OWL CF Owl Creek  R YELLOWSTONE - GREYBU  Timber Creek #2 Wood River #2  R YELLOWSTONE - SHOSHO	R YELLOWSTONE - WIND RIVER  Big Warm 8800 Burroughs Creek 8800 Dinwoodie 10000 Dinwoodie Glaciers 10000 Dry Creek 9500 DuNoir 8750 Geyser Creek 8500 Little Warm 9500 Sheridan R.S. #2 7500 T-Cross Ranch 8000 Togwotee Pass 9600 Twenty Lakes 10000  R YELLOWSTONE - POPO AGIE RIVE  Blue Ridge 9500 Bruce's Camp 6500 Hobbs Park 10000 Mosquito Park R.S. 9500 Sawmill Glade 8500 South Pass 9000 St. Lawrence R.S. 9000 Trout Creek 8400  R YELLOWSTONE - OWL CREEK Owl Creek 8700  R YELLOWSTONE - GREYBULL RIVER  Timber Creek #2 8800 Wood River #2 8000	Date of Survey   Su	Date of Survey   Show Depth Survey   Show Depth Survey   Survey   Show Depth Survey	Snow Course Name   Elev.   Survey   Content (In.)	Date of Depth Content Content Name   Elev.   Date of Depth Content Content (In.)   Content Content (In.)   C	Date of Snow Course Name   Date of Survey   Survey   Content (In.)   Last 15-Year Average 1943-57

<sup>\*</sup>Average for years of record shown in 1943-57 base period. \*\*Average of all past data.

E Estimated water content.

<sup>#</sup>Adjacent drainage.



#### WYOMING SNOW SURVEYS ABOUT MAY 1, 1961

					mation		Record	
	0		Date	Snow	Water		ntent (In.)	Years
37 -	Snow Course	TP 2	of		Content	Last	15-Year	Record
No.	Name	Elev.	Survey	(In.)	(In.)	Year	Average	Used in
							1943-57	Average
T OTTE	R YELLOWSTONE - NOWOOD	COTTL	CUEII CD	שישיש				
TOWE	R TELLOWSTONE - NOWOOD	Ourre -	SUETT OU	CCL				
#7F2	Canyon Creek	7400	4/29	45	15.5	10.0		1
7E25		8700	5/1	26	8.2	3.1	6.6**	5
7E24		9500	5/1	41	13.0	9.3		4
#7E8	Munkres Pass	9700	5/1	30	8.0	7.4	9.7**	10
#7E27	Onion Gulch	8100	4/26	37	8.7	5.6	8.8**	5
7E35		8300	4/25	33	5.5	5.4		4
7E26		9075	4/25	40	9.3	8.6		4
#7E21		9600	4/25	79	25.2	20.8	23.9**	5
#7E20		9200	4/24	75	22.0	16.6		4
#7E18		9200	4/27	65	18.8	16.0		4
7E22		7800	5/2	0	0.0	0.0		4
#7E17	Granite Pass	8950	4/27	58	17.1	16.4	20.1**	5
7E4	Ranger Creek	8800	5/2	24	7.3	3.1	7.2	24
7E23		9600	5/2	51	14.9	13.9	16.2**	5
LOWE	R YELLOWSTONE - PORCUPI	INE CREEK						
רכיודמ	Eise Comings Eslic	7500	1/20	26	77.0	2.9	6.5**	E
7E31 #7E30		7500 9000	4/28	60	7.8		17.4**	5 5
# (5)	Medicine wheel	9000	4/20	00	18.4	14.6	17.4^^	2
LOWE	R YELLOWSTONE - TONGUE	RIVER						
7E32	Big Goose #2	7700	4/29	27	7.7	4.6	11.0**	5
7E33	Burgess R.S. #2	7900	4/25	24	7.1	7.8	8.8**	6
7E34	Dome Lake #2	8800	4/30	37	10.8	9.8	12.7**	5
7E14	Gloom Creek	9300	4/26	55	16.4	15.3	17.1**	5
7E11	Sibley Lake	8000	4/28	31	9.3	6.9	11.1**	5
7E10	Steamboat Point	7500	4/28	26	7.5	6.5	10.7**	5
7E12	Sucker Creek	9000	4/26	44	13.1	11.9	15.0**	5
7E13	Wood Rock G.S.	8500	4/26	40	11.4	10.6	12.7**	5
T 01 701								
LOWE	R YELLOWSTONE - POWDER	RIVER						
#7E28	Muddy Creek G.S.	7500	5/1	14	4.2	1.0	3.8**	5
7E5	Soldier Park	8700	5/2	20	6.2	4.3	5.9**	11
7E6	Sour Dough	8500	5/1	23	6.9	2.0	7.2	21
	_							

<sup>\*\*</sup>Average of all past data.
#Adjacent drainage.



## WYOMING STREAMFLOW FORECASTS MAY 1, 1961

Basin and Tributary	April 1 - September 30  Seasonal Streamflow in Thousands of Acre Feet  Forecast Percent Measured 15-Year  Runoff 15-Year Runoff Average Average 1959 1943-57			
NORTH POPO AGIE Milford (near)	50	58	55	86*
LITTLE POPO AGIE Lander (near)	22	45	25	49*
WIND RIVER Dubois (at)	63	57	88	110*

All stream data taken from observed flow records with the following exceptions: 2/ Forecasts prepared by George W. Peak, Soil Conservation Service, Casper, Wyoming.

<sup>\*</sup> Average is for less than 15 years of record in the 1943-57 period.



#### Agencies Cooperating in Collecting Data Contained in this Bulletin

- U. S. Forest Service Region I, Missoula, Montana
- U. S. Geological Survey Helena, Montana
- U. S. Army Corps of Engineers Portland, Oregon Seattle, Washington Omaha, Nebraska Riverdale, N. D.
- U. S. Indian Irrigation Service St. Ignatius, Montana
- U. S. Weather Bureau Helena, Montana
- U. S. Fish & Wildlife Service Red Rock Lakes Refuge Monida, Montana
- U. S. Bureau of Reclamation Billings, Montana Boise, Idaho
- Montana Power Company Butte, Montana
- Agricultural Experiment Station North Montana Branch Station Havre, Montana
- Montana State Highway Dept. East Glacier, Montana

- National Park Service Yellowstone National Park Glacier National Park
- Montana Experiment Station Montana State College Bozeman, Montana
- Bonneville Power Administration Portland, Oregon
- Montana State School of Forestry Montana State University Missoula, Montana
- Soil Conservation Service Montana, Wyoming, Idaho
- Soil Conservation Districts Montana Counties
- Johnson Flying Service, Inc. Missoula, Montana
- Water Rights Branch
  Dept. of Lands & Forests
  Victoria, British Columbia
- Department of Northern Affairs & National Resources Calgary, Alberta

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